

This is a scanned version of the text of the original Soil Survey report of Ada County Area, Idaho issued May 1980. Original tables and maps were deleted. There may be references in the text that refer to a table that is not in this document.

Updated tables were generated from the NRCS National Soil Information System (NASIS). The soil map data has been digitized and may include some updated information. These are available from <http://soildatamart.nrcs.usda.gov>.

Please contact the State Soil Scientist, Natural Resources Conservation Service (formerly Soil Conservation Service) for additional information.

Foreword

This soil survey contains information useful in land-planning programs in Ada County Area. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

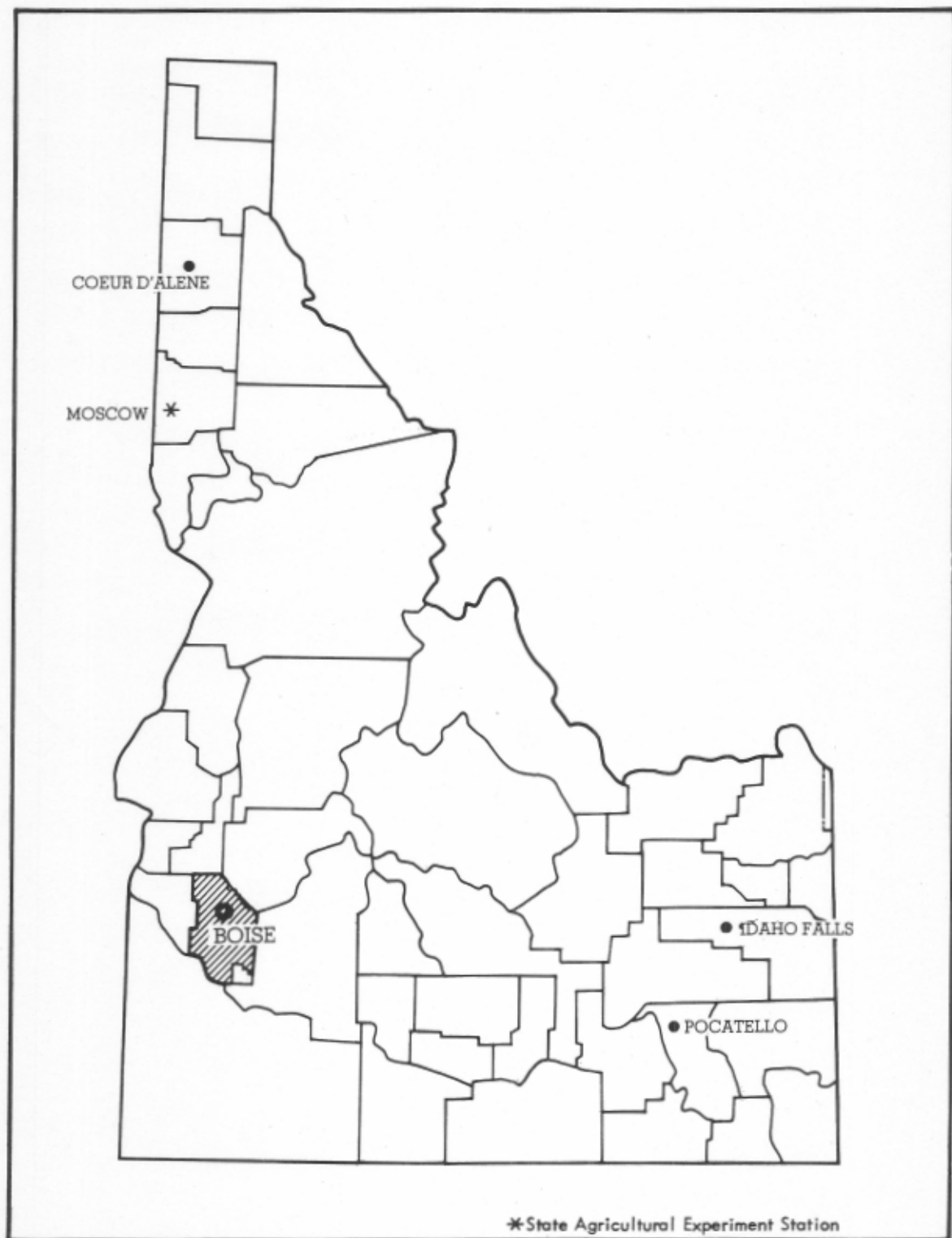
This soil survey has been prepared for many different users. Farmers, ranchers, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

A handwritten signature in dark ink, reading "Amos I. Garrison, Jr." with a stylized flourish at the end.

Amos I. Garrison, Jr.
State Conservationist
Soil Conservation Service



Location of Ada County Area in Idaho.

soil survey of Ada County Area Idaho

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United States Department of Agriculture, Soil Conservation Service in
cooperation with
United States Department of the Interior, Bureau of Land Management University of
Idaho College of Agriculture, Idaho Agricultural Experiment Station Idaho Soil
Conservation Commission

ADA COUNTY AREA is in southwestern Idaho. This survey area includes all of Ada County except for the parts that are in the Boise National Forest and the Army National Guard Maneuvering Area. The survey area covers 567,372 acres, or about 887 square miles.

Ada County is bounded on the north by Gem and Boise Counties, on the south and east by Elmore County, on the southwest by Owyhee County, and on the west by Canyon County.

General nature of the area

This section provides general information about the survey area. It discusses the geomorphic setting, history and development, climate, agriculture, and water supply.

Geomorphic setting

Monte D. Wilson, Professor of Geology, Boise State University, assisted in writing this section.

The survey area lies in two major geomorphic provinces. The northeastern part of the survey area is in the Idaho Batholith subdivision of the Northern Rocky Mountain province. The rest is in the Malheur-Boise Basin section of the High Lava Plains subprovince of the Columbia Intermontane province (3).

The topography is diverse. It includes the deep canyon of the Snake River; an extensive lava plain with scattered basalt domes and cinder cones; the valley of the Boise River with its low to moderate gradient and three major alluvial terraces (fig. 1), and the hills and mountains of the Boise Front. Local relief ranges from nearly level on the plain and in the river valley to very steep in the canyon and mountain areas. The elevation ranges

from 2,260 feet at the Snake River to 5,750 feet at the Boise Front.

Most of the survey area drains into the Boise River, which drains into the Snake River. The southern part of the survey area drains directly into the Snake River.

History and development

British fur trappers were the first explorers on record to enter the Boise Valley. In 1834, the British established Old Fort Boise at the mouth of the Boise River, but, in 1854, they abandoned it. In 1862, gold was discovered in the Boise Basin, and gold rush towns sprang up quickly as word of the discovery spread. In 1863, the U. S. Army built Fort Boise on what is now the northeast part of the Boise townsite.

In 1864, Idaho became a state, and Ada County was formed from the southern part of Boise County. Boise was named the county seat and the State capital. Boise grew rapidly as a supply center for the mines. Its early growth can be attributed, in part, to its location. It was at the crossroads of the Old Oregon Trail and the road from the Boise Basin to the mines in Owyhee County.

In 1869, the territorial prison was built and the U. S. Assay Office was constructed. In 1884, the Old Oregon Short Line Railroad reached Boise, and the pace of development increased. In 1886, the territorial capital was built.

In April 1977 the population of Boise was 99,771, and the total population of Ada County was 139,400. The county population was increasing at a rate of 3 percent per year. Boise is the headquarters for several large business enterprises, which have a significant effect on the growth rate of the area. Meridian, Kuna, Eagle, Star, and Garden City also are principal towns in Ada County.



Figure 1.-River-cut terraces south of the Boise River.

Climate

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Ada County winters, though cold, are generally not too severe. In summer, days are hot and nights are fairly cool. Precipitation, except in mountainous areas, is low in summer, but in a few places it is adequate for nonirrigated small grains. The snowpack at high elevations supplies much of the water for irrigated cropland.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Boise for the period 1951 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 33 degrees F, and the average daily minimum temperature is 25 degrees. The lowest temperature on record, which occurred at Boise on December 10, 1972, is -23 degrees. In summer the average temperature is 71 degrees, and the average daily maximum temperature is 86 degrees.

The highest recorded temperature, which occurred on July 19, 1960, is 111 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual precipitation in the survey area ranges from about 24 inches at the higher elevations of the Boise Front to slightly less than 8 inches in a strip adjacent to the Snake River. The average in most of the central part of the survey area is between 10 and 12 inches. The weather station at the Boise Municipal Airport records an average of 11.5 inches. Of this total, 4 inches, or 33 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 3 inches. The heaviest 1-day rainfall during the period of record was 1.91 inches at Boise on June 12, 1958. There are about 15 thunderstorms each year; 12 occur in summer.

Average seasonal snowfall is 23 inches. The greatest snow depth at any one time during the period of record was 7 inches. On the average, 11 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon in spring is less than 40 percent; during the rest of the year, it is about 45 percent. Humidity is higher at night, and the average at dawn is about 65 percent. The percentage of possible sunshine is 83 in summer and 44 in winter.

Over most of the survey area, northwesterly winds prevail, and intermittent southeasterly winds occur in winter and spring. At the Boise Municipal Airport, southeasterly winds prevail because cold, heavy air masses drain down the Boise Front into the Boise River Canyon during cool periods.

Agriculture

Farming began in the Boise Valley almost immediately after the discovery of gold in the Boise Basin in 1862. The primary products were vegetables and grain for Boise and the mining communities. Range cattle and sheep were introduced to the area a short time later. Dairying began about 1900.

The first farms were on the Boise River flood plain. Water for irrigation was first diverted from the river by simple ditches. Farmer cooperatives built small diversion dams and canals before 1900.

The Reclamation Act of 1902 marked the beginning of rapid expansion of agriculture in the Boise Valley. The Boise project is one of the oldest federal reclamation projects. The construction of reservoirs, canals, and irrigation control structures began in 1904; and land above the flood plain was first irrigated in 1906.

The Dry Creek Soil and Water Conservation District (now the Ada Soil Conservation District) was organized in 1948 to help control the seasonal flooding along Dry Creek, in the northern part of the survey area. The flooding occurred as a result of siltation in the lower end of the creek channel, which forced spring runoff onto the fertile irrigated land. The eroding soils on the Boise Foothills were the source of the sediment.

The soils in this survey area are used mainly for wheat, barley, oats, corn, dry beans, mint, hay, and pasture. Some soils are suited to sugar beets and potatoes. To a limited extent, alfalfa, clover, and such specialty crops as vegetables are grown for seed.

Water supply

The principal water supply in the survey area is the Boise River, which drains some 27,000 square miles of mountainous terrain lying north and east of the survey area. Three dams lie upstream from the City of Boise. Arrowrock Reservoir, completed in 1915, was the first dam constructed for irrigation water storage. Anderson Ranch Dam, on the South Fork of the Boise River, was

completed in 1950. It provides hydroelectric power. Lucky Peak Dam was later constructed by the Army Corps of Engineers primarily for flood control. Now, through coordination with the other dams, its storage capability has been improved. It will also be adapted for hydroelectric power generation to help meet the rising demand for energy.

The Boise River and its tributaries have an extensive flood plain. Despite the dams and other flood control measures on the river the potential for flooding still exists in some areas.

There are about 15 organized irrigation districts and canal companies and several unorganized canal companies which use water from the Boise River. About 1,200,000 acre feet is diverted annually for irrigation.

The Snake River also provides irrigation water for the southern part of the survey area. Approximately 9,500 acres is irrigated by pumping the water some 550 feet out of the Snake River Canyon. Swan Falls Dam on the Snake River provides hydroelectric power and flood control.

Deep wells provide irrigation water for several farms south of the older irrigation projects. These wells range in depth from 200 to 600 feet.

Wells supply water for domestic use in the Ada County Area. Most of these wells range in depth from 80 to 150 feet. Several artesian wells supply water for irrigation as well as for domestic use in the northern part of the survey area.

A particularly important ground water resource in the survey area is the natural hot water from wells in the lower foothills above Boise. The water temperature reaches about 140 degrees F. This water was first utilized in 1892 by the Warm Springs Water District, mainly for heating houses and greenhouses and for domestic use. In deep exploratory wells in other parts of the survey area, water temperatures approaching 400 degrees F have been recorded. The potential uses of this resource include the heating and cooling of large buildings in Boise and expanded residential use.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After classifying and naming the soils, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

Only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to farmers, managers of rangeland, engineers, planners, developers and builders, home buyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows map units that have a distinct pattern of soils, relief, and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscape in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

Soils on mountains

The soils in this group are at the higher elevations in the northeastern part of the survey area. The elevation ranges from about 3,000 to 5,750 feet. The soils are sloping to very steep. The average annual precipitation is 16 inches, and the average annual temperature is 45 degrees F. The average frost-free season is 120 days.

These soils are moderately deep and very deep, and they are well drained. They are used mainly as rangeland and wildlife habitat and for recreation. Slope, inaccessibility, and depth to rock are the main limitations to engineering uses.

The soils in this group make up about 9 percent of the survey area.

1. Searles-Ladd-Ola

Sloping to very steep, well drained, moderately deep and very deep soils; on granitic mountains

The soils in this map unit are on mountain side slopes and foot slopes. These soils developed in granitic residuum and colluvium from the Idaho Batholith. They are drained primarily by small, intermittent streams. The slope ranges from 4 to 80 percent.

This map unit makes up about 9 percent of the survey area. It consists of about 40 percent Searles soils, 30 percent Ladd soils, 15 percent Ola soils, and 15 percent minor soils.

Searles soils generally are on south- and west-facing side slopes. They are moderately deep. Typically, the surface layer is gravelly loam. The subsoil is very gravelly coarse sandy clay loam, and it is underlain by bedrock at a depth of about 30 inches.

Ladd soils are mainly on north- and east-facing colluvial foot slopes. They are very deep. Typically, the surface layer is loam, and the subsoil and the substratum are sandy clay loam.

Ola soils are mainly on steep north- and east-facing side slopes. They are moderately deep. Typically, the surface layer is loam in the upper part and fine gravelly sandy loam in the lower part. The underlying layers are loam and fine gravelly sandy loam. Weathered granite is at a depth of about 38 inches.

The minor soils in this map unit are the well drained, moderately deep, loamy Rainey soils on south-facing side slopes.

The soils in this map unit are used mainly as rangeland and wildlife habitat and for recreation.

Slope and inaccessibility are the main limitations to building site development and other engineering uses.

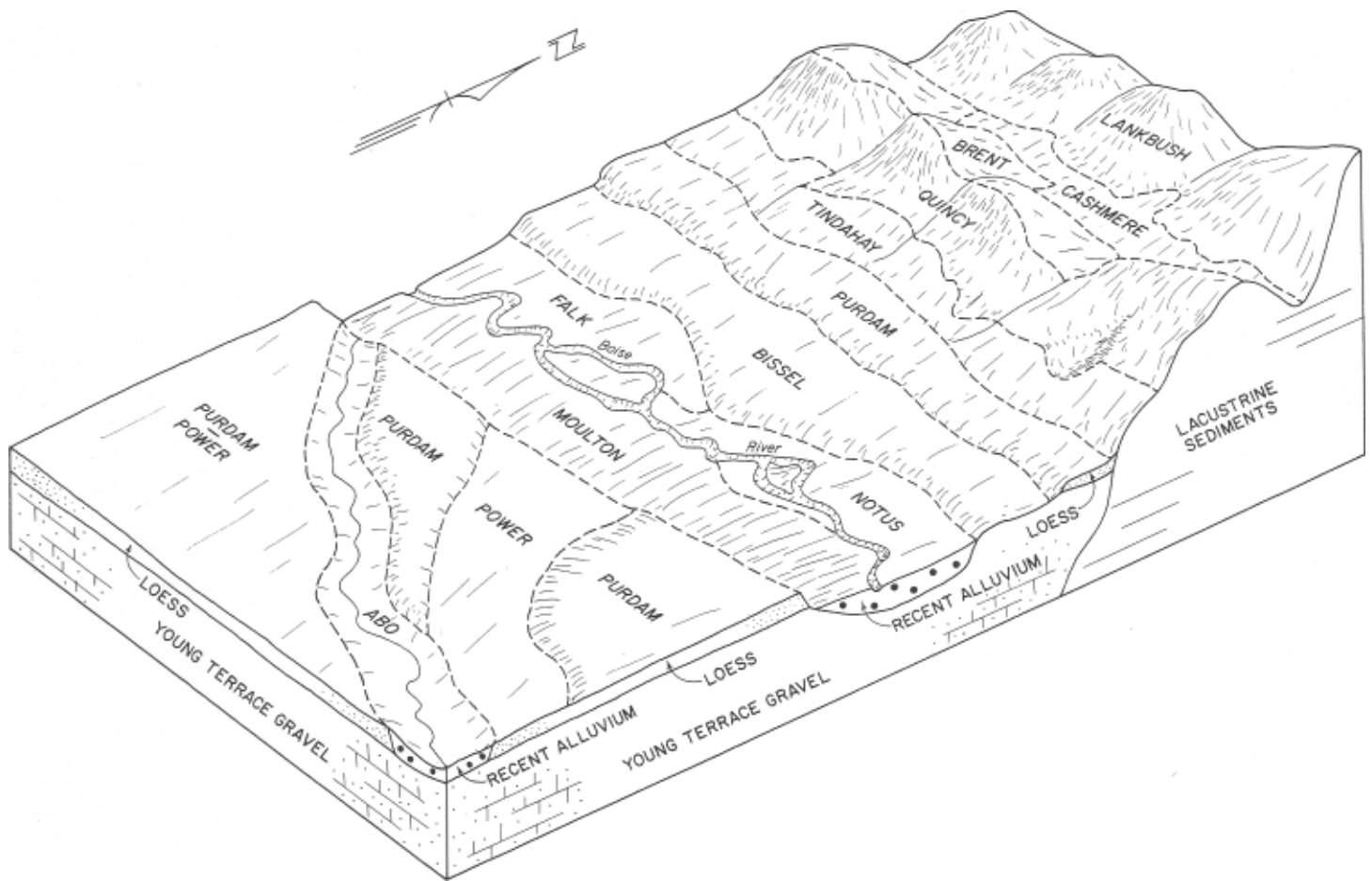


Figure 2.-Typical pattern of soils in the Quincy-Lankbush-Brent, low rainfall, map unit and in the Notus-Moulton-Falk; and Purdam-Abo-Power map units.

Depth to rock is an additional limitation to these uses on the Searles and Ola soils.

Soils on lacustrine foothills

The soils in this group are on the foothills above the Boise River. The elevation ranges from about 2,800 feet to about 3,400 feet. The soils are nearly level to very steep. The average annual precipitation is 12 inches, and the average annual temperature is 50 degrees F. The average frost-free season is about 120 days.

These soils are very deep, and they are well drained to excessively drained. They are used mainly as rangeland and wildlife habitat and for recreation. In a few areas, the less sloping soils are used for farming. Slope and inaccessibility are the main limitations to building site development and other engineering uses.

This group consists of two map units, which make up about 15 percent of the survey area.

2. Quincy-Lankbush-Brent, low rainfall

Nearly level to very steep, excessively drained and well drained, very deep soils, on alluvial fans and terraces in the foothills.

The soils in this map unit are on alluvial fans and terraces in the foothills (fig. 2). The foothills have a dominant aspect of northeast or southwest. The soils formed in eolian material, acid igneous alluvium, and lacustrine sediments. They are drained primarily by small, intermittent streams. The slope ranges from 0 to 80 percent.

This map unit makes up about 13 percent of the survey area. It consists of about 20 percent Quincy soils; 20 percent Lankbush soils; 15 percent Brent, low rainfall, soils; and 45 percent minor soils.

Quincy soils formed mainly in eolian deposits on the south-facing side slopes of alluvial terraces in the foot-

hills. They are excessively drained. Typically, the surface layer and the underlying material are fine gravelly loamy coarse sand.

Lankbush soils generally are on south- and west-facing side slopes of alluvial fans and terraces in the foothills. They are well drained. Typically, the surface layer is sandy loam, and the subsoil consists of clay loam and loam. The substratum is sandy loam.

Brent, low rainfall, soils generally are on north- and east-facing slopes of terraces in the foothills. These Brent soils are on lower positions on the landscape than the typical Brent soils, and they receive less moisture. They are well drained. Typically, the surface layer is loam. The subsoil is clay. The substratum is gravelly clay loam in the upper part and gravelly loamy coarse sand in the lower part.

The minor soils in this map unit are the well drained loamy Haw and Van Dusen soils on north- and east-facing side slopes of foothills; the well drained loamy Cashmere soils on the toe slopes of foothills and in broad drainageways; and the well drained, clayey Day soils, which commonly occur in volcanic sediments.

In most areas of this map unit, the soils are used as rangeland and wildlife habitat. In some areas, the less sloping soils are used for dryland farming. Soft winter wheat, barley, and alfalfa are the major crops. The soils in the western part of this map unit are less suitable for dryland farming because they receive less moisture. The soils on the lower foothills adjacent to the cities of Boise and Eagle are used as sites for residential development.

Slope and inaccessibility are the main limitations to building site development and other engineering uses. Low strength is an additional limitation to these uses on the Lankbush soils and the Brent soils. A high shrink-swell potential limits the Brent soils for some uses. The hazards of erosion and sedimentation are limitations to the use of the soils in this map unit because of the fragile vegetative cover and the highly erosive nature of the soils. Flash flooding is a hazard in the major drainageways during summer cloudbursts.

3. Cashmere-Tindahay

Nearly level to steep, well drained and somewhat excessively drained, very deep soils, in drainageways and on alluvial fans and low alluvial terraces in the foothills

The soils in this map unit are in drainageways and on alluvial fans and low alluvial terraces in the foothills. The soils on the alluvial fans developed in colluvium and alluvium. Those in the drainageways developed in alluvium. The soils are drained primarily by small, intermittent streams. The slope ranges from 0 to 30 percent.

This map unit makes up about 2 percent of the survey area. It consists of about 45 percent Cashmere soils, 35 percent Tindahay soils, and 20 percent minor soils.

Cashmere soils generally are on south- and west-facing alluvial fans and in broad drainageways in the foothills. They are well drained. Typically, the surface

layer and the subsoil are coarse sandy loam. The substratum consists of coarse sandy loam and loamy coarse sand.

Tindahay soils generally are on alluvial fans and low alluvial terraces adjacent to drainageways. They are somewhat excessively drained. Typically, the surface layer is fine sandy loam. The underlying material consists of fine sandy loam, sandy loam, loamy coarse sand, and fine gravelly loamy coarse sand.

The minor soils in this map unit are the loamy Haw and Payette soils on north- and east-facing side slopes of foothills and the sandy Quincy soils and the loamy Lankbush soils on south- and west-facing side slopes.

In most areas of this map unit, the soils are used as rangeland and wildlife habitat. In a few areas, they are used for irrigated crops and pasture if water is available. Hay and grains are the major irrigated crops. Potatoes, sugar beets, and corn are grown on the more nearly level soils. In some areas, the soils are used for residential development.

Unstable cutbanks and slope are the main limitations to building site development and other engineering uses. Flash flooding is a hazard in the drainageways during summer cloudbursts.

Soils on flood plains and low terraces and in drainageways

The soils in this group are on flood plains and low terraces and in drainageways along the Boise River. The elevation ranges from about 2,500 feet, near Star, to about 2,700 feet, near Boise. The soils are nearly level to sloping. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F. The average frost-free season is 150 days.

These soils are very deep, and they are poorly drained and somewhat poorly drained or well drained. Most of the acreage of these soils is used for farming, but a large acreage is used for urban development. The soils in this group are a good source of sand and gravel.

This group consists of two map units, which make up about 13 percent of the survey area.

4. Notus-Moulton-Falk

Nearly level, poorly drained and somewhat poorly drained, very deep soils, on flood plains and the adjacent low alluvial terraces

The soils in this map unit are on the flood plains of the Boise River and on the adjacent low alluvial terraces (fig. 2). The soils developed in alluvium. They are drained by the Boise River. The slope ranges from 0 to 3 percent.

This map unit makes up about 9 percent of the survey area. It consists of about 15 percent Notus soils, 15 percent Moulton soils, 10 percent Falk soils, and 60 percent minor soils.

Notus soils are on the flood plains and low alluvial terraces. They are somewhat poorly drained. Typically,

the surface layer is sandy loam. The underlying material is loamy sand in the upper part and very gravelly sand in the lower part. The water table is at a depth of 3 to 5 feet in summer unless the soils are artificially drained.

Moulton soils are on the flood plains. They are poorly drained. Typically, the surface layer and the subsoil are fine sandy loam. The substratum is fine sandy loam in the upper part and very gravelly loamy sand in the lower part. The water table is at a depth of 1.5 to 3 feet in summer unless the soils are artificially drained.

Falk soils are mainly on low alluvial terraces adjacent to the flood plains. They are somewhat poorly drained. Typically, the surface layer is fine sandy loam. The underlying material is fine sandy loam in the upper part and very gravelly coarse sandy loam and very gravelly sand in the lower part. The water table is at a depth of 3 to 5 feet in summer unless the soils are artificially drained.

The minor soils in this map unit are the well drained, loamy Bissell soils; the somewhat poorly drained, loamy Bram soils; the moderately well drained, loamy Drax soils; and the somewhat poorly drained, silty Goose Creek soils. These soils are on low terraces adjacent to the flood plains. Also included are the very poorly drained, loamy Chance soils in drainageways and in depressions in the flood plains.

Most of the acreage of this map unit is used as irrigated cropland; a large acreage is used for urban and residential development. Alfalfa, corn, mint, small grains, and sugar beets are the major crops. In the wetter areas of this map unit, the soils are mainly in permanent pasture. The soils in this map unit have many recreation uses.

Flooding, depth to the water table, and frost action potential are the main limitations to building site development and other engineering uses. Flooding has been minimized by the dams and levees on the Boise River; however, areas adjacent to the river flood during the spring runoff if they are not adequately protected.

5. Power-Aeric Haplaquepts-Jenness

Nearly level to sloping, poorly drained and well drained, very deep soils, in drainageways and on low alluvial terraces

The soils in this map unit are in the major drainageways and on the low alluvial terraces south of the Boise River. The soils developed mainly in alluvium. They are drained by Tenmile Creek and Indian Creek, which span the survey area from east to west. The slope ranges from 0 to 12 percent.

This map unit makes up about 4 percent of the survey area. It consists of about 20 percent Power soils, 10 percent Aeric Haplaquepts, 10 percent Jenness soils, and 60 percent minor soils.

Power soils generally are sloping and are in areas adjacent to the flood plain. They are well drained. Typically, the surface layer is silt loam, the subsoil is silty clay loam, and the substratum is loam.

Aeric Haplaquepts are in the drainageways. They are somewhat poorly drained. The slope ranges from 0 to 3 percent. The surface layer ranges in texture from silt loam to very gravelly loam. In the subsoil the range is silty clay loam to very gravelly clay loam.

Jenness soils generally are on the higher positions in the drainageways, and they are on the alluvial terraces. They are well drained. Typically, the surface layer is fine sandy loam, and the underlying material consists of fine sandy loam, loam, sandy loam, and silt loam.

The minor soils in this map unit are the somewhat poorly drained, silty Abo soils and the moderately well drained, loamy Drax soils. These soils are in the drainageways. Also included are the well drained, sandy Feltham soils, which are mainly sloping and are in areas adjacent to the flood plain.

The drainageways become broader as they pass through the western part of the map unit. In this part, the soils are used mainly for irrigated crops and pasture. Alfalfa is the major crop; some row crops are grown in the broad bottom lands. The soils in the eastern part of this map unit are used as rangeland. Blacks Creek Reservoir and Indian Creek Reservoir, also in the eastern part of the map unit, provide habitat for waterfowl and other wildlife.

Low strength and frost action potential are the main limitations to building site development on the Power and Jenness soils. Shallowness to the water table is an additional limitation to this use on the Aeric Haplaquepts. In parts of this map unit, flooding is a hazard early in spring in years of high runoff.

Soils on alluvial terraces, basalt plains, dissected alluvial plains, and alluvial fans and in canyons; and Rubble land on canyon walls

The soils in this group are in the central and southern parts of the survey area. The elevation ranges from about 2,260 feet, at the floor of the Snake River Canyon, to about 3,500 feet, at Christmas Mountain. The natural vegetation is dominantly sagebrush and bunchgrass. The average annual precipitation is 10 inches, and the average annual temperature is 52 degrees F. The average frost-free season is 150 days.

These soils are shallow to very deep; and they are somewhat poorly drained, well drained, and somewhat excessively drained. They are used mainly for farming and as rangeland and wildlife habitat. A significant acreage is used for urban development. In the southern part of the survey area, soils that have not been cleared are used as rangeland. Adjacent to the rim of Snake River Canyon is a Birds of Prey Natural Area managed by the U.S. Department of the Interior. The soils that developed in alluvium are a potential source of sand and gravel.

This group consists of eight map units, which make up about 63 percent of the survey area.

6. Purdam-Abo-Power

Nearly level to sloping, somewhat poorly drained and well drained, moderately deep and very deep soils; on low alluvial terraces

The soils in this map unit are on the lowest of the three major alluvial terraces south of the Boise River (fig. 2). The soils developed in loess or silty alluvium over sand and gravel. They are drained by Fivemile Creek, Tenmile Creek, and other natural drainages that flow to the northwest. Numerous open drains improve surface and subsurface drainage. The slope ranges from 0 to 12 percent.

This map unit makes up about 6 percent of the survey area. It consists of about 60 percent Purdam soils, 20 percent Abo soils, 10 percent Power soils, and 10 percent minor soils.

Purdam soils are mainly on the higher positions on the alluvial terraces. They are well drained and moderately deep. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of silt loam and loam and, at a depth of about 37 inches, a weakly cemented hardpan. Sandy loam underlies the hardpan and extends to a depth of 60 inches or more.

Abo soils are in broad drainageways on alluvial terraces. They are somewhat poorly drained and very deep. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of silt loam, loam, and fine gravelly coarse sandy loam.

Power soils are mainly in gentle depressions dominantly on alluvial terraces. They are well drained and very deep. Typically, the surface layer is silt loam, the subsoil is silty clay loam, and the substratum is loam.

The minor soils in this map unit are the poorly drained, very deep, loamy Aeric Haplaquepts in drainageways and the well drained, moderately deep, silty Elijah soils on the higher positions on the landscape.

Most of the acreage of this map unit is used for irrigated crops and pasture. Corn, small grains, mint, and hay are the major crops. The cropland provides habitat for several species of upland game birds. A large acreage of this map unit is used for urban and residential development. In some large areas, these soils are a source of sand and gravel.

Low strength is a limitation to building site development on these soils. Shallowness to the water table is an additional limitation to this use on the Abo soil, and depth to the hardpan is an additional limitation to this use on the Purdam soil.

7. Colthorp-Elijah-Purdam

Nearly level to sloping, well drained, moderately deep and shallow soils; on intermediate alluvial terraces and basalt plains

The soils, in this map unit are on broad alluvial terraces and basalt plains. They are mainly on the intermediate of the three major alluvial terraces south of the Boise River.

The soils developed in loess or silty alluvium over coarse textured alluvium or basalt. These soils are drained by Eightmile Creek, Mason Creek, and small, natural drainageways that flow to the northwest. Numerous open drains improve surface and subsurface drainage. The slope ranges from 0 to 8 percent.

This map unit makes up about 10 percent of the survey area. It consists of about 60 percent Colthorp soils, 25 percent Elijah soils, 10 percent Purdam soils, and 5 percent minor soils.

Colthorp soils are mainly on the higher positions on the basalt plains. They are shallow to a strongly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of silt loam and loam, and, at a depth of about 19 inches, a strongly cemented hardpan. Basalt underlies the pan at a depth of about 28 inches.

Elijah soils are mainly on intermediate positions on the alluvial terraces and basalt plains. They are moderately deep to a strongly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of loam and silt loam and, at a depth of about 31 inches, a strongly cemented hardpan. Sand and gravel or, in some areas, basalt underlies the pan.

Purdam soils are mainly on the lower positions on the alluvial terraces. They are moderately deep to a weakly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of silt loam and loam and, at a depth of about 37 inches, a weakly cemented hardpan. Sandy loam underlies the pan.

The minor soils in this map unit are the poorly drained, very deep, loamy Aeric Haplaquepts in drainageways; the well drained, shallow, silty Pipeline soils on the higher positions on the alluvial terraces; and the well drained, very deep, silty Power soils mainly in gentle depressions.

Most of the acreage of this map unit is used for irrigated crops and pasture. Corn, small grains, and hay are the major crops. The cropland provides habitat for several species of upland game birds. A large acreage of this map unit is used for urban and residential development. In some areas, these soils are a source of sand and gravel.

Depth to the hardpan and low strength are the main limitations to building site development. Depth to rock is an additional limitation to this use on the Colthorp soils and on some Elijah soils.

8. Tenmile-Chilcott-Kunaton

Nearly level to very steep, well drained, shallow to very deep soils; on high alluvial terraces, basalt plains, and dissected alluvial plains

The landscape of this map unit consists of three major geomorphic features—a dissected alluvial plain, a basalt plain, and an alluvial terrace. The dissected alluvial plain,

on the highest position on the landscape, is characterized by rolling hills in the eastern part of this map unit. The basalt plain is on an intermediate position on the landscape. The alluvial terrace is on the lower positions on the landscape. This terrace is the highest of the three major alluvial terraces, south of the Boise River. The soils in the northern part of this map unit are drained mainly by Eightmile Creek, Fivemile Creek, and Lydle Gulch; the soils in the southern part are drained by Tenmile Creek. The slope ranges from 0 to 65 percent.

This map unit makes up about 10 percent of the survey area. It consists of 15 percent Tenmile soils, 15 percent Chilcott soils, 10 percent Kunaton soils, and 60 percent minor soils.

Tenmile soils are mainly on steeper positions on high alluvial terraces and on the side slopes of drainageways. They are very deep. Typically, the surface layer is very gravelly loam, and the subsoil consists of very gravelly clay loam and very gravelly sandy clay. The substratum is very gravelly sandy clay loam in the upper part and very gravelly loamy coarse sand in the lower part.

Chilcott soils are mainly nearly level and are on alluvial terraces and basalt plains. They are moderately deep to a strongly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay. The substratum consists of loam over a strongly cemented hardpan, which is at a depth of about 26 inches. Sandy loam and coarse sand or, in some areas, basalt underlies the hardpan.

Kunaton soils are mainly on gentle ridges and slightly convex areas on the basalt plains. They are shallow to a strongly cemented hardpan. Typically, the surface layer is silty clay loam. The subsoil is silty clay. A strongly cemented hardpan underlies the subsoil at a depth of about 13 inches. Basalt underlies the pan.

The minor soils in this map unit are the steep, very deep, loamy Ada soils on north-facing side slopes on dissected alluvial plains; the moderately deep, silty Bowns soils on basalt plains; the very deep, loamy Lankbush soils on high alluvial terraces; the shallow, silty Pipeline and Ridenbaugh soils on alluvial terraces; and the moderately deep, silty Sebree soils on alluvial terraces and basalt plains.

In most areas of this map unit, the soils are used as rangeland and wildlife habitat. In some areas, the less sloping soils are used for irrigated crops and pasture. Corn, small grains, and hay are the major crops. In a few areas, the soils are used as a source of sand and gravel. In some areas, they are used for residential development.

Slope and shrink-swell potential are the main limitations to building site development on the Tenmile soils. Depth to a strongly cemented hardpan, low strength, and shrink-swell potential are limitations to this use on the Chilcott and Kunaton soils. Depth to rock is an additional limitation to this use on the Kunaton soil and on some Chilcott soils.

9. Chilcott-Kunaton-Sebree

Nearly level to sloping, well drained, shallow and moderately deep soils; on basalt plains and high alluvial terraces

The soils in this map unit are on a basalt plain and a high alluvial terrace. These soils developed in loess or silty alluvium. They are drained by Indian Creek, North Indian Creek, and Sand Creek. The slope ranges from 0 to 8 percent.

This map unit makes up about 9 percent of the survey area. It consists of about 25 percent Chilcott soils, 15 percent Kunaton soils, 10 percent Sebree soils, and 50 percent minor soils.

Chilcott soils are mainly nearly level, and they are on the high alluvial terraces and the basalt plain. They are moderately deep to a strongly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay (fig. 3). The substratum consists of loam and, at a depth of about 26 inches, a strongly cemented hardpan. Sandy loam and coarse sand or, in some areas, basalt underlies the pan.

Kunaton soils are mainly on gentle ridges and in slightly convex areas on higher positions on the plain. They are shallow to a strongly cemented hardpan. Typically, the surface layer is silty clay loam. The subsoil consists of silty clay and, at a depth of about 13 inches, a strongly cemented hardpan. Basalt underlies the hardpan.

Sebree soils are mainly nearly level, and they are on intermediate positions on the high alluvial terraces and on the basalt plain. These are saline-alkali soils that occur as small, subrounded, slick spots throughout areas of the Chilcott and Kunaton soils. They are moderately deep to a strongly cemented hardpan. Typically, the surface layer and the subsoil are silty clay loam. The substratum consists of loam and, at a depth of about 34 inches, a strongly cemented hardpan. Sand and gravel or, in some areas, basalt underlies the pan.

The minor soils in this map unit are the moderately deep, silty Bowns and McCain soils on the basalt plains; the very deep, silty Chardoton and Kiesel Variant soils on the alluvial terraces; and the very deep, silty Power soils in the drainageways.

In most areas of this map unit, the soils are used as rangeland and wildlife habitat. In a few areas, they are used for irrigated crops and pasture. Corn, small grains, and hay are the major irrigated crops. There is some dryland farming in the Orchard area. Dryland yields are low, and crop failure is a hazard because of the lack of sufficient moisture in most years. Soft winter wheat is the major dryland crop. This map unit is bounded on the south by the Army National Guard Maneuvering Area.

Low strength, depth to a strongly cemented hardpan, and shrink-swell potential are the main limitations to building site development. Depth to rock is an additional

limitation to this use on the Kunaton soils and on some Chilcott and Sebree soils.

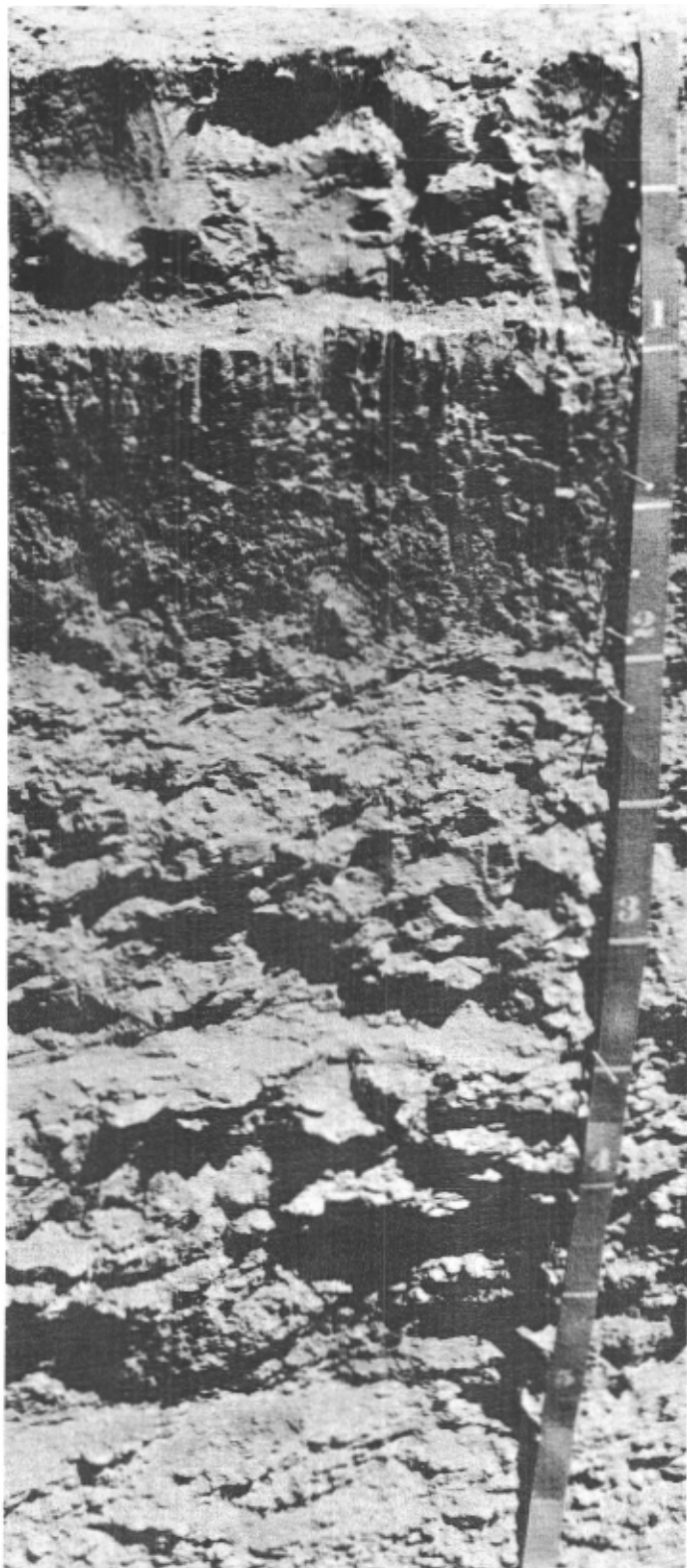


Figure 3.-This profile of a Chilcott soil shows the strong structure in the subsoil.

10. Power-McCain-Purdam

Nearly level to sloping, well drained, moderately deep and very deep soils, on basalt plains and low alluvial terraces

This map unit consists of soils on a basalt plain and on alluvial terraces. These soils formed in loess or silty alluvium over coarser textured alluvium or basalt. The soils in the northern part of this map unit are drained to the northwest, mainly by Sand Creek. The soils in the southern part are drained mainly to the southwest by small, intermittent streams. The slope ranges from 0 to 12 percent.

This map unit makes up about 9 percent of the survey area. It consists of about 35 percent Power soils, 30 percent McCain soils, 10 percent Purdam soils, and 25 percent minor soils.

Power soils are mainly nearly level or slightly concave and are on the alluvial terraces and the basalt plain. They are very deep. Typically, the surface layer is silt loam, the subsoil is silty clay loam, and the substratum is loam.

McCain soils are mainly on ridges and near rock outcrops on the basalt plains. They are moderately deep to bedrock. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum is loam, and it is underlain by basalt at a depth of about 33 inches.

Purdam soils are mainly on higher positions on the alluvial terraces. They are moderately deep to a weakly cemented hardpan. Typically, the surface layer is silt loam, and the subsoil is silty clay loam. The substratum consists of silt loam and loam and, at a depth of about 37 inches, a weakly cemented hardpan. Sandy loam underlies the pan.

The minor soils in this map unit are the shallow, silty Colthorp soils and the moderately deep, silty Elijah soils, mainly on ridges; the moderately deep, mainly gently sloping silty Potratz and Scism soils in basins; and the shallow, silty Trevino soils on ridges and near rock outcrops.

Most of the acreage of this map unit is used as rangeland and wildlife habitat. Some areas are used for irrigated crops and pasture. Corn, sugar beets, small grains, and hay are the major crops. In some areas the soils are used as a source of sand and gravel.

Low strength and frost action potential are limitations to building site development on these soils. Depth to the hardpan is an additional limitation to this use on the Purdam soils. Depth to rock is an additional limitation to this use on the McCain soils.

11. Scism-Truesdale-Turbyfill

Nearly level to steep, well drained, moderately deep and very deep soils, on basalt plains

The soils in this map unit are on broad basalt plains. The soils developed in loess or silty alluvium and eolian deposits. They are drained to the south by small, intermittent streams. The slope ranges from 0 to 35 percent.

This map unit makes up about 15 percent of the survey area. It consists of about 35 percent Scism soils, 25 percent Truesdale soils, 10 percent Turbyfill soils, and 30 percent minor soils.

Scism soils are on basalt plains. They are moderately deep to a weakly cemented hardpan. Typically, the surface layer is silt loam. The underlying material consists of silt loam and, at a depth of about 32 inches, a weakly cemented hardpan. Silt loam or basalt underlies the pan.

Truesdale soils are mainly in the southern part of the map unit. They are moderately deep to a weakly cemented hardpan. Typically, the surface layer, the subsoil, and the substratum are fine sandy loam. A weakly cemented hardpan is at a depth of about 25 inches. Fine sandy loam or basalt underlies the pan.

Turbyfill soils are on basalt plains, mainly in drainageways or downslope from drainageways. They are very deep. Typically, the surface layer and the underlying material are fine sandy loam.

The minor soils in this map unit are the very deep, sandy Feltham soils mainly in drainageways and on dunes downwind from the drainageways; the silty Garbutt soils, mainly on low alluvial fans; moderately deep, silty Minidoka soils on the higher positions on the landscape; and the shallow, loamy Shabliss and Trio soils, mainly on ridges and near rock outcrops.

Most of the acreage of this map unit is used as rangeland. Potatoes, sugar beets, small grains, and alfalfa are the major crops. A narrow area near the southern margin of this map unit is part of a Birds of Prey Natural Area managed by the U.S. Department of the Interior.

Low strength and depth to the hardpan are the major limitations to building site development on the Scism and Truesdale soils. Depth to rock is an additional limitation to this use on some Scism and Truesdale soils. Low strength and frost action potential are limitations to this use on the Turbyfill soils.

12. Scism-Feltham-Garbutt

Nearly level to sloping, well drained and somewhat excessively drained, moderately deep and very deep soils; on alluvial terraces, alluvial fans, and basalt plains

The soils in this map unit are on a basalt plain, alluvial terraces, and alluvial fans in the southwestern part of the survey area. The soils developed in loess or alluvium. They are drained to the south and west by small intermittent streams. The slope ranges from 0 to 12 percent.

This map unit makes up about 1 percent of the survey area. It consists of about 40 percent Scism soils, 30 percent Feltham soils, 10 percent Garbutt soils, and 20 percent minor soils.

Scism soils are mainly on the higher positions on the basalt plains. They are moderately deep to a weakly

cemented hardpan (fig. 4). Typically, the surface layer is silt loam. The underlying material consists of silt loam and, at a depth of about 32 inches, a weakly cemented hardpan. Silt loam or, in some areas, basalt underlies the pan.

Feltham soils are mainly in drainageways on terraces and alluvial fans. They are very deep. Typically, the surface layer is loamy sand; and the underlying material consists of loamy sand, sandy loam, fine sandy loam, or fine sand.

Garbutt soils are on alluvial fans and in gently sloping depressions on the basalt plains. They are very deep. Typically, the surface layer is silt loam, and the underlying material consists of silt loam and very fine sandy loam.

The minor soils in this map unit are the very deep, sandy Quincy soils on dunes; the shallow, silty Trevino soils mainly on ridges and near rock outcrops; and the very deep, loamy Turbyfill soils in broad drainageways and in depressions. Also of minor extent are areas of Rubble land on the slopes of the stream-cut terrace escarpment, which extends north to south through this map unit.

Most of the acreage of this map unit is used for irrigated crops and pasture. Potatoes, sugar beets, corn, small grains, and hay are the major crops. A large acreage is used as rangeland (fig. 5) and wildlife habitat. A narrow area near the southern margin of this map unit is part of a Birds of Prey Natural Area managed by the U.S. Department of the Interior.

Low strength, depth to the hardpan, and in some areas, depth to rock are the major limitations to building site development on the Scism soils. Low strength is the only major limitation to this use on the Garbutt soils. There are no major limitations to building site development on the Feltham soils.

13. Rubble land-Trevino-Feltham

Steep and very steep Rubble land on canyon walls and nearly level to moderately steep, well drained and somewhat excessively drained, shallow and very deep soils on alluvial fans and basalt plains and in canyons

The landscape of this map unit consists of a basalt plain and the Snake River Canyon south of the plain (fig. 6). The soils on the plain developed in loess. The soils in the canyon developed in alluvium or eolian deposits. The soils in this map unit are drained by small, intermittent streams. The slopes range from nearly level on the basalt plain to nearly vertical on the canyon walls.

This map unit makes up about 3 percent of the survey area. It consists of 25 percent Rubble land, 20 percent Trevino soils, 20 percent Feltham soils, and 35 percent minor soils and Rock outcrop.

Rubble land is on canyon walls and consists of areas of stones and boulders that are virtually free of vegetation except for lichens.

Trevino soils are on the basalt plain. They are well drained and shallow to bedrock. Typically, the surface



Figure 4. -Scism soils are characterized by a weakly cemented hardpan in the lower part of the profile. The tape is scaled in decimeters.

layer is extremely stony silt loam, and the subsoil is stony silt loam. The substratum consists of silt loam and loam, and it is underlain by basalt at a depth of about 19 inches.

Feltham soils mainly make up the dunes on alluvial fans in the Snake River Canyon. They are also in drainageways and on the plain, downslope from drainageways. They are somewhat excessively drained and very deep. Typically, the surface layer is loamy sand, and the underlying material consists of loamy sand, sandy loam, fine sandy loam, and fine sand.

The minor soils in this map unit are the somewhat poorly drained, very deep, loamy Bram soils in lower areas of the canyon bottom; the excessively drained, very deep, sandy Quincy soils, mostly on sand dunes in the canyon; the well drained, shallow, loamy Shabliss and Trio soils on the plain; and the well drained, moderately deep, loamy Vanderhoff soils on lacustrine sediments in the canyon.

Most of the acreage of this map unit is part of a Birds of Prey Natural Area managed by the U.S. Department of the Interior. The restrictions on the use of this natural area are intended to protect the habitat for the endangered Peregrine falcon and other raptors that nest in the canyon. The soils on the basalt plain provide habitat for Townsend ground squirrel, jackrabbit, and other small animals that constitute the diet of the raptors. Some of the acreage in this map unit is used as rangeland. The Swan Falls Dam on the Snake River is in this map unit.

Broad land use considerations

Approximately 39 percent of the survey area is federally owned and is mainly under the jurisdiction of the Bureau of Land Management. About 8 percent of the survey area is state owned.

About 20 percent of the survey area is irrigated cropland and pasture. Cereal grains, corn, dry beans, and hay are the dominant crops. The cropland and pasture are scattered throughout the area, but are concentrated in map units 4, 6, 7, 10, and 12, which consist of soils that have good potential for these uses. The soils in map units 11 and 12 also have good potential for potatoes and sugar beets. Much of the nonirrigated land in the southern part of the area has good potential for crops if water becomes more readily available.

About 3 percent of the survey area is dry cropland. Soft winter wheat and alfalfa are the major crops. Most of this cropland is in map unit 1; a limited acreage is in map unit 9. Marginal precipitation is the main limitation to this use on the soils in map unit 9. Slope and low rainfall in some years are the major limitation to this use on the soils in map unit 1.

Approximately 9 percent of the survey area is in urban and residential development. The soils in this use are mainly in map units 4, 6, and 7. The soils in map unit 6 have the best potential for urban uses; however, the Abo soil and minor soils in this map unit have a high water



Figure 5.-This rangeland in an area of the Scism-Feltham-Garbutt map unit is grazed by cattle and sheep in winter and early in spring.

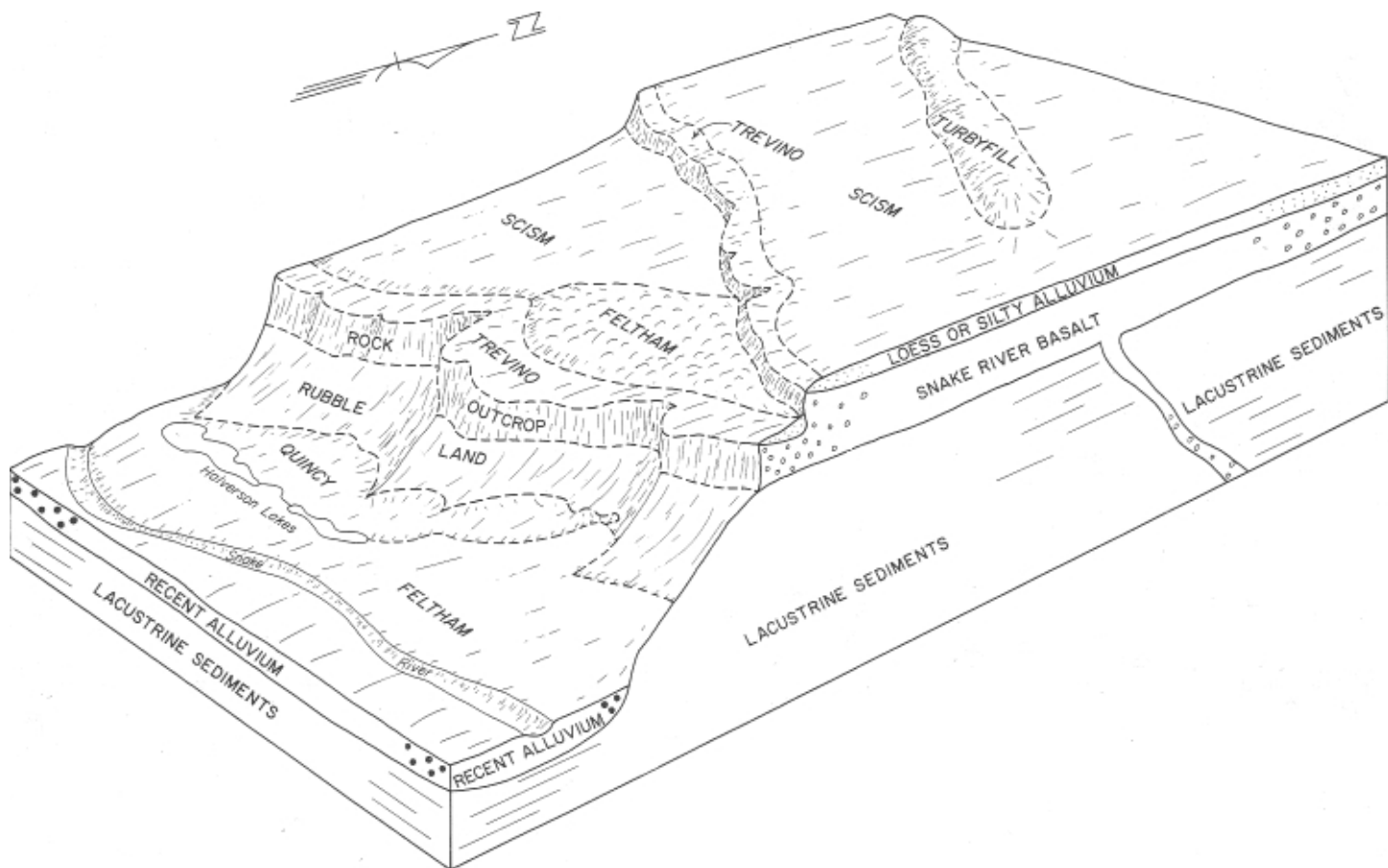


Figure 6.-Typical pattern of soil and miscellaneous areas in the Rubble land-Trevino-Feltham map unit.

table, which limits their potential (fig. 7). Some areas of this map unit are subject to occasional flooding in spring. In most areas of map unit 8 a high water table is a limitation to urban development. The soils in map unit 7 are limited for residential development mainly by the depth to the hardpan or to bedrock. Residential development has extended into some areas of map unit 2. In this map unit, steepness of slope is the major limitation to residential development; shrink-swell potential and low strength are additional limitations to this use on the Brent soil.

The rest of the survey area, including most of map units 1, 2, 8, 9, 10, 11, and 13, is rangeland. About 177,000 acres is privately owned, but the majority is federally or state owned. The soils in most areas of map units 1 and 2 have good potential for use as rangeland. Forage production is low on the Quincy soil because of droughtiness. The soils in map unit 9 provide good forage if grazed only early in spring and late in fall. Forage production is low on soils in map units 8, 10, 11, and 13 because of low rainfall. The soils in map units 10, 11, and 13 are grazed extensively late in winter and early in spring, mainly by sheep.

The soils in Ada County Area support wildlife habitat on a variety of landscapes-from steep mountains to desert. Topography, climate, vegetation, and other factors determine the kinds of soils in an area, and the soils

affect the kind and amount of vegetation that is available to wildlife as food and cover. The general soil map, therefore, can be used to locate various types of habitat and the wildlife.

The soils in map units 1 and 2 provide habitat for several species of wildlife. These soils provide critical winter range for one of Idaho's largest deer herds. A few elk and an occasional black bear are also found in areas of these map units although both of these species prefer to stay farther away from man if possible. Other inhabitants of the area include coyote, fox, rabbit, rockchuck, songbirds, and game birds such as chukar, Hungarian partridge, mountain quail, and doves. The natural vegetation and the mountainous topography provide ideal habitat for this wildlife community.

Popular fishing sites in the survey area are the Lucky Peak Reservoir in map unit 1; the Boise River, in map unit 4; the Snake River in map units 12 and 13; Blacks Creek Reservoir and Indian Creek Reservoir in map unit 5; the Halverson Lakes, in map unit 12; and the lower part of Indian Creek in map unit 5. Lucky Peak Reservoir, the Boise River, and Indian Creek are best known for their rainbow trout. The Snake River supports some rainbow trout; however, catfish, largemouth and small-mouth bass, crappie, and other warm-water fish are most abundant. The Halverson Lakes support yellow perch, bullhead, and bluegill. Black bass and bullhead are com-

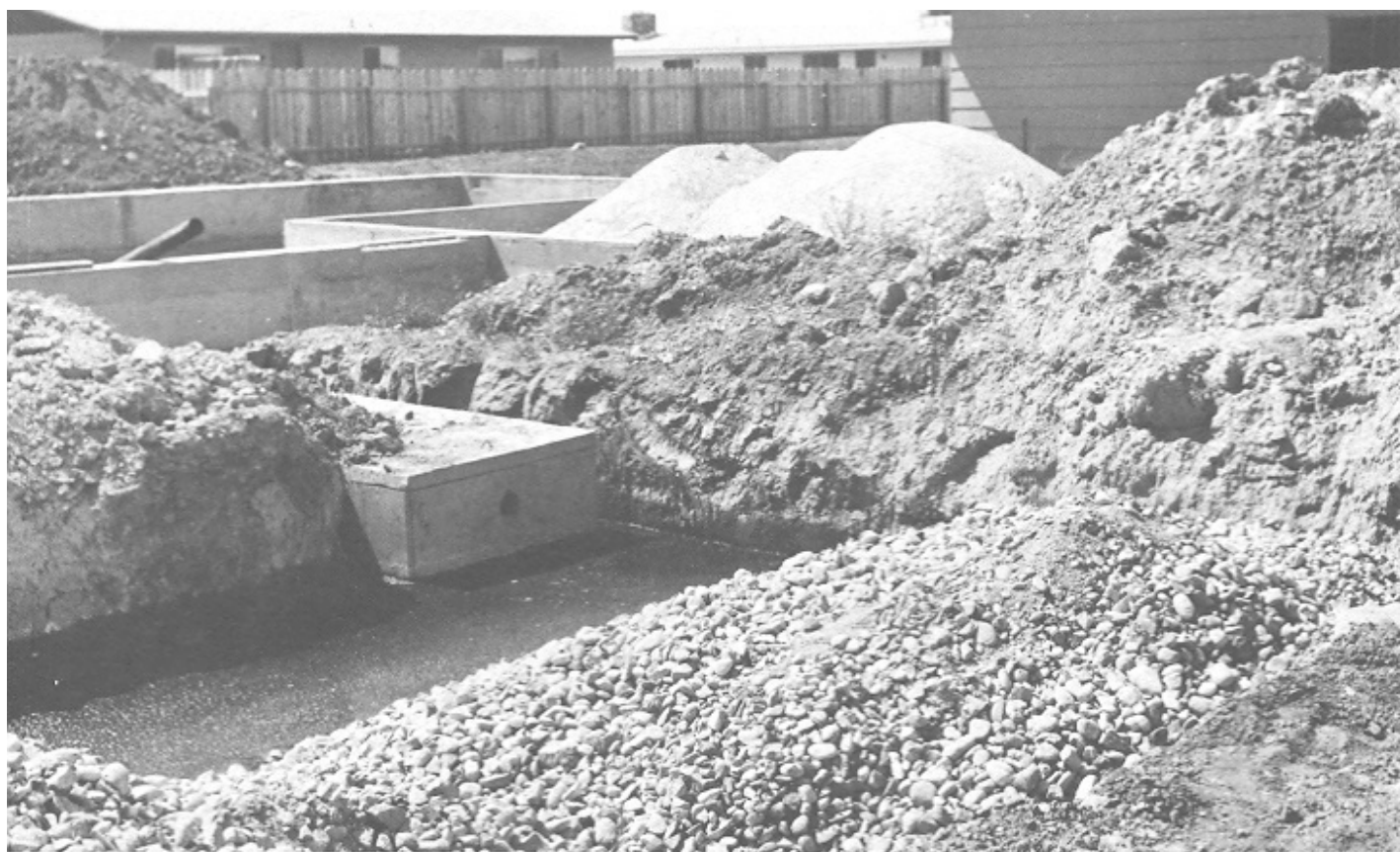


Figure 7.-The seasonal high water table is a limitation to the use of Abo soils as sites for urban development.

monly found in Indian Creek Reservoir and Blacks Creek Reservoir.

Upland game birds such as the Chinese ringneck pheasant, Hungarian partridge, and doves inhabit the cropland. Some migratory waterfowl rest on the cropland but most rest near the Boise River, the Snake River, and the other water areas.

Eagles, falcons, and other raptors inhabit the Snake River Canyon area. This area is the site of the Snake River Birds of Prey Natural Area-26,255 acres in map units 12 and 13-managed by the U.S. Department of the Interior. The canyon area provides ideal nesting and abundant prey. It is habitat for many jackrabbits and cottontail rabbits which are important to the diet of the larger hawks and the eagles. The silty soils in map units 11 and 12 provide habitat for many Townsend ground squirrels, which are important to the diet of the falcons.

Bald eagles commonly nest in wooded areas on the flood plain of the Boise River, just downstream from Lucky Peak Dam, in map unit 4.

The great blue heron inhabits parts of map unit 4. Two large rookeries are along the Boise River, near Eagle.

The long-billed curlew has several nesting areas throughout the survey area, mainly in map units 2, 5, 8, and 9.

Coyote and badger are abundant throughout the entire survey area. Fox are most numerous in map units 1, 2, and 4, but many inhabit the irrigated cropland. Bobcats are occasionally observed in the Snake River Canyon area of map units 12 and 13 and near Rocky Canyon, in map unit 2.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have profiles that are almost alike make up a soil series. Except for allowable differences in texture of the surface layer or of the underlying substratum, all

the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Ola series, for example, was named for the town of Ola in Gem County, Idaho.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a soil phase commonly indicates a feature that affects use or management. For example, Purdam silt loam, 0 to 2 percent slopes, is one of several phases within the Purdam series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Power-McCain complex, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Notus soils is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Rock outcrop is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary,

Soil descriptions

1-Abo silt loam. This soil is very deep and somewhat poorly drained. It formed in mixed alluvium in broad drainageways and on low alluvial terraces. The slope ranges from 0 to 3 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is pale brown silty clay loam about 13 inches thick. The substratum in the upper part is pale brown and light yellowish brown loam and silt loam about 35 inches thick. In the lower part, to a depth of about 65 inches, it is pale brown fine gravelly coarse sandy loam.

Included in mapping are small areas of Aeric Haplaquepts, nearly level; Power silt loam, 0 to 2 percent slopes; Purdam silt loam, 0 to 2 percent slopes; and Urban land. These inclusions make up about 15 percent of the map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great. The water table is at a depth of 3 to 5 feet during the peak of the irrigation season.

In most areas, this soil is used for irrigated crops and pasture. The major crops are alfalfa hay, field corn, silage corn, wheat, and sugar beets. Oats, mint, barley, and sweet corn are also grown. In some areas, this soil is used for residential and urban development.

The seasonal water table is the major limitation to agriculture; it limits the growth of some deep-rooted crops. Tile drains can be used to lower the water table if a suitable outlet is available.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for urban and residential development is limited by the seasonal water table and the hazard of flooding. Houses with basements are affected by the water table unless drainage is provided.

The seasonal water table limits this soil for use as septic tank absorption fields. In summer there may not be enough unsaturated soil material between the seepage lines and the water table to effectively filter the effluent, and contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated zone with suitable fill material can help to reduce this hazard. Connection to a closed community sewer system is an alternative.

The use of this soil as sites for streets, sidewalks, driveways, and other paved surfaces is limited by a

hazard of frost action. Suitable subgrade material can help offset this limitation.

Digging and trenching are hampered by the water table. It may be necessary to use pumps at excavation sites in summer.

This map unit is in capability subclass IIw, irrigated.

2-Ada gravelly sandy loam, 4 to 15 percent slopes.

This soil is very deep and well drained. It formed in coarse, granitic alluvium on alluvial terraces. The elevation is 2,700 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum consists of light brown and variegated very gravelly loamy coarse sand, and sand and gravel, to a depth of 60 inches or more.

Included in mapping are small areas of Brent loam, 4 to 15 percent slopes; Day clay, 5 to 15 percent slopes; and Ladd loam, 4 to 15 percent slopes. Included soils make up about 15 percent of the map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedlings are most successful in fall or early in spring.

The use of this soil as sites for residential development and road construction is limited primarily by slope, slow permeability, shrinking and swelling, and unstable cutbanks. These limitations can be offset by special design.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IVe, nonirrigated.

3-Ada gravelly sandy loam, 15 to 30 percent slopes.

This soil is very deep and well drained. It formed in coarse, granitic alluvium on alluvial terraces. The elevation is 2,700 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum consists of light brown and variegated very gravelly loamy coarse sand, and sand and gravel, to a depth of 60 inches or more.

Included in mapping are small areas of Brent loam, 15 to 30 percent slopes; Day clay, 15 to 30 percent slopes; and Ladd loam, 15 to 30 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is rapid, and the hazard of erosion is high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, this soil is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedings are most successful late in fall or early in spring.

The use of this soil as sites for residential development or road construction is limited primarily by slope, slow permeability, shrinking and swelling, and unstable cutbanks. These limitations can be offset by special design.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass Vle, nonirrigated.

4-Ada gravelly sandy loam, 30 to 60 percent slopes. This soil is very deep and well drained. It formed in coarse, granitic material on alluvial terraces. The elevation is 2,700 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum consists of light brown and variegated very gravelly loamy coarse sand, and sand and gravel, to a depth of 60 inches or more.

Included in mapping are small areas of Ladd loam, 30 to 60 percent slopes. This soil makes up about 10 percent of the map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

This soil is used as rangeland and wildlife habitat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is impractical because of the steep slopes.

This map unit is in capability subclass VIIe, nonirrigated.

5-Aeric Haplaquepts, nearly level. These soils are very deep and somewhat poorly drained. They formed in mixed alluvium in drainageways on the alluvial terraces south of the Boise River. The slope ranges from 0 to 3 percent. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

These soils are too variable in texture and depth to sand and gravel to map individually. The surface layer ranges in texture from silt loam to very gravelly loam. The subsoil ranges in texture from clay loam to very gravelly clay loam. Depth to sand and gravel ranges from 20 to 60 inches. Depth to mottles ranges from 10 to 20 inches. Flooding is a hazard in years of unusually high precipitation. Depth to the water table ranges from 18 to 36 inches in summer. Runoff is very slow, and the hazard of erosion is slight.

Included in mapping are small areas of Abo silt loam, 0 to 3 percent slopes; Elijah silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; and Purdam silt loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

In most areas, these soils are used for irrigated permanent pasture. In some areas, they are used for alfalfa hay, alfalfa seed, field corn, sweet corn, wheat, barley, oats, mint, and other irrigated crops. In some areas, they are used for residential and urban development.

Wetness is the major limitation to agriculture. The water table restricts the growth of some deep-rooted crops and can impede farm implements. Tile drains can be used to lower the water table if a suitable outlet is available.

Border, furrow, corrugation and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

Wetness is the major limitation to the use of these soils as sites for urban and residential development and for most engineering uses.

The use of these soils as septic tank filter fields is severely limited by the fluctuating water table. If effluent is discharged into this water table, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter zone above the water table with suitable fill material can reduce this hazard. Connection to a closed community sewer system is an alternative if a facility is available.

Digging and trenching are hampered by the water table. It may be necessary to use pumps at excavation sites in summer.

The water table is a limitation to the use of these soils as sites for houses with basements unless drainage is provided.

This map unit is in capability subclass IIIw, irrigated.

6-Baldock loam. This soil is very deep and poorly drained. It formed in dominantly acid igneous alluvium on low alluvial terraces adjacent to the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray loam about 8 inches thick. The subsoil is light brownish gray loam about 11 inches thick. The substratum is light brownish gray and gray heavy loam and fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Bram silt loam, Falk fine sandy loam, and Moulton fine sandy loam. These included soils make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow or slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great. The water table is at a depth of 2 to 3 feet during the peak of the irrigation season.

In most areas, this soil is used for irrigated crops and pasture. The major field crops are field corn, corn silage, wheat, alfalfa hay, and sugar beets. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used for residential and urban development.

The seasonal water table is the major limitation to agriculture; it limits the growth of some deep-rooted crops. Tile drains can be used to lower the water table if a suitable outlet is available.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and

pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil as sites for residential development is limited by the seasonal water table, the hazard of flooding, cutbanks caving, and frost action potential.

The use of this soil as septic tank absorption fields is severely limited by the seasonal water table. If effluent is discharged into this water table, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter zone above the water table with fill material can help to reduce this hazard. Connection to a closed community sewer system is an alternative if a facility is available.

Trenching and digging are hampered by the water table. It may be necessary to use pumps at excavation sites in summer.

This map unit is in capability subclass IIIw, irrigated.

7-Beetville fine sandy loam. This soil is very deep and moderately well drained. It formed in acid igneous alluvium on low terraces adjacent to the Boise River. The slope ranges from 0 to 3 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer in the upper part is grayish brown fine sandy loam about 10 inches thick. In the lower part it is grayish brown sandy loam about 4 inches thick. The underlying material in the upper part is light brownish gray and very pale brown sandy loam, fine sandy loam, and loam about 33 inches thick. In the lower part it is variegated loamy coarse sand to a depth of 60 inches or more.

Included in mapping are small areas of Falk fine sandy loam, Goose Creek loam, and Moulton fine sandy loam. These soils make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great. The water table is at a depth of 4 to 6 feet during the peak of the irrigation season.

In most areas, this soil is used for irrigated crops and pasture. The major field crops are field corn, corn silage, wheat, and sugar beets. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for urban and residential development.

The water table poses no serious problem for agriculture that is under good management.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the seasonal high water table, hazard of flooding, frost action potential, and low strength.

This map unit is in capability class I, irrigated.

8-Bissell loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in dominantly acid igneous alluvium on low alluvial terraces. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically the surface layer is brown loam about 9 inches thick. The subsoil is brown and pale brown clay loam and loam about 37 inches thick. The substratum is pale brown loamy sand to a depth of 60 inches or more.

Included in mapping are small areas of Bram silt loam, Drax loam, Falk fine sandy loam, Moulton fine sandy loam, and Notus soils. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are alfalfa hay, field corn, corn silage, wheat, and sugar beets. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for urban and residential development.

There are no major limitations to agriculture. Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The main limitations to residential development are shrink-swell potential and the moderately slow permeability.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can be offset by placing the seepage lines below the subsoil or by increasing the size of the absorption field.

The moderate shrink-swell potential of the subsoil limits this soil for use as sites for houses. Suitable backfill material can help to minimize the stress on basement walls that is caused by the shrinking and swelling of the subsoil.

Roads, driveways, and other paved surfaces need to be designed to offset low strength, shrinking and swelling, and frost action. Suitable subgrade material is necessary.

This map unit is in capability class I, irrigated.

9-Bissell loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in dominantly acid igneous alluvium on low alluvial terraces. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown loam about 9 inches thick. The subsoil is brown and pale brown clay loam and loam about 37 inches thick. The substratum is pale brown loamy sand to a depth of 60 inches or more.

Included in mapping are small areas of Bram silt loam, Drax loam, Falk fine sandy loam, Moulton fine sandy

loam, and Notus soils. These soils make up about 10 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major field crops are alfalfa hay, field corn, corn silage, wheat, and sugar beets. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for urban and residential development.

The hazard of erosion is the major limitation to agriculture. Erosion can be controlled through proper management of irrigation. Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The main limitations to residential development are shrink-swell potential and the moderately slow permeability.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can be offset by placing seepage lines below the subsoil or by increasing the size of the absorption field.

The moderate shrink-swell potential of the subsoil limits this soil for use as sites for houses. Suitable backfill can help to minimize the stress on basement walls that is caused by the shrinking and swelling.

Roads, driveways, and other paved surfaces need to be designed to offset low strength, frost action, and shrinking and swelling. Suitable subgrade material is necessary.

This map unit is in capability subclass IIe, irrigated.

10-Bowns stony loam, 0 to 8 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains and ridges. The elevation is 3,000 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown or light yellowish brown stony loam about 7 inches thick. The subsoil is pale brown, light yellowish brown, or yellowish brown silty clay loam and silty clay about 21 inches thick. The substratum is very pale brown loam and extends to a depth of about 35 inches. It is underlain by fractured basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chardoton stony loam, 0 to 2 percent slopes; Chilcott silt loam, 0 to 8 percent slopes; Kunaton silty clay loam, 0 to 4 percent slopes; a soil that is similar to Kunaton silty clay loam

but has slopes of 4 to 8 percent; and Sebree silty clay loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability of this Bowns soil is slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is very slow through medium, and the hazard of erosion is slight or moderate.

In most areas this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone, surface stones, slow permeability, and slow rate at which irrigation water moves into the soil are the major limitations to agriculture. Bedrock hinders the growth of some deep-rooted crops. Stones on the surface impede tillage. Removing the stones improves the suitability of this soil for row crops. The heavy textures in the plow layer limit the yield and quality of potatoes, sugar beets, and other root crops and impede harvesting. Proper irrigation water management and crop selection are extremely important in overcoming these limitations.

The use of this soil for residential development is limited by the slow permeability, depth to rock, low strength, and shrink-swell potential.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

11-Bowns-Rock outcrop complex, 0 to 15 percent slopes. The soil and Rock outcrop in this complex are on basalt plains and ridges. The elevation is 3,000 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

About 65 percent of the complex is Bowns extremely stony loam, 0 to 15 percent slopes; and 20 percent is Rock outcrop. The rest is Chardoton silty clay loam, 0 to 4 percent slopes; Chilcott silt loam, 4 to 8 percent slopes; Kunaton silty clay loam, 2 to 4 percent slopes; and Sebree silty clay loam, 4 to 8 percent slopes.

The Bowns soil is moderately deep to basalt, and it is well drained. It formed in loess or silty alluvium. Typically, the surface layer is pale brown and light yellowish brown extremely stony loam about 7 inches thick. The subsoil is pale brown, light yellowish brown, and yellowish brown silty clay loam and silty clay about 21 inches thick. The substratum is very pale brown loam. It is underlain by jointed and fractured basalt at a depth of about 35 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability is slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff ranges from very slow through rapid, and the hazard of erosion is slight or high.

Rock outcrop consists of areas where the basalt is exposed. Most of the outcrops are elongate ridges and mounds ranging from a few feet to 20 feet in height. There are cracks on the crest of the ridges and mounds.

This complex is used as rangeland and wildlife habitat. The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The soil is best suited to livestock grazing in spring and fall. Range seeding by conventional methods is limited by stones and the Rock outcrop.

This complex is in capability subclass VIIs, nonirrigated.

12-Bram silt loam. This soil is very deep and somewhat poorly drained. It formed in mixed alluvium on low alluvial terraces adjacent to the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray silt loam about 3 inches thick. The subsoil is pale brown very fine sandy loam about 16 inches thick. The substratum is pale brown and very pale brown very fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Chance fine sandy loam, Falk fine sandy loam, Moulton fine sandy loam, and Notus soils. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great.

In most areas, this soil is used for irrigated crops and pasture. The major crops are alfalfa hay, field corn, silage corn, wheat, and sugar beets. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used for residential development.

Salinity, alkalinity, and a seasonal high water table are the primary limitations to agriculture. The plow layer is moderately saline and is not suited to some crops. The water table is at a depth of 36 to 60 inches during the peak of the irrigation season unless the soil is artificially drained. It hinders the growth of sugar beets, alfalfa, and other deep-rooted crops. Artificial drainage, irrigation water management, and proper crop selection are needed to overcome these limitations.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil.

The use of this soil for residential development is limited by the seasonal high water table, flooding, slow permeability, frost action, and low strength.

This map unit is in capability subclass Illw, irrigated.

13-Brent loam, low rainfall, 0 to 2 percent slopes.

This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial terraces. The elevation is 2,600 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Included in mapping are small areas of Chilcott silt loam, 0 to 2 percent slopes; Lankbush sandy loam, 0 to 2 percent slopes; Sebree silty clay loam, 0 to 2 percent slopes; and Tenmile very gravelly loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and residential development. The major crops are alfalfa hay, wheat, field corn, corn silage, and sugar beets. Sweet corn and barley are also grown.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

This soil is well suited to irrigated farming. Returning crop residue to the soil and turning under green manure crops help to maintain the content of organic matter.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the very slow permeability, low strength, and shrink-swell potential.

The very slow permeability limits the use of this soil as septic tank absorption fields. This limitation can generally

be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. In some areas where the substratum is coarse textured, contamination of nearby water supplies is a hazard.

The low strength and shrink-swell potential limit the use of this soil as sites for houses. The low strength can affect foundations and other structures that support heavy loads. The shrinking and swelling stress basement walls; but suitable backfill can help to minimize the stress.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability class I, irrigated, and subclass Vlc, nonirrigated.

14-Brent loam, low rainfall, 2 to 4 percent slopes.

This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial terraces. The elevation is 2,600 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Included in mapping are small areas of Chilcott silt loam, 2 to 4 percent slopes; Lankbush sandy loam, 2 to 4 percent slopes; Sebree silty clay loam, 2 to 4 percent slopes; and Tenmile very gravelly loam, 2 to 4 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and for residential development. The major crops are alfalfa hay, wheat, field corn, corn silage, and sugar beets. Sweet corn and barley are also grown.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The hazard of erosion is the major limitation to agriculture. Erosion can be controlled by stubble mulching and minimum tillage. Terraces and diversions are effective in controlling erosion on long slopes that have a uniform grade.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the very slow permeability, shrink-swell potential, and low strength.

The very slow permeability limits the use of this soil as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. In some areas where the substratum is coarse textured, contamination of nearby water supplies is a hazard.

The low strength and shrink-swell potential limit the use of this soil as sites for houses. The low strength can affect foundations and other structures that support heavy loads. The shrinking and swelling stress basement walls; but suitable backfill can help to minimize the stress.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

15-Brent loam, low rainfall, 4 to 8 percent slopes.

This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial terraces. The elevation is 2,600 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Included in mapping are small areas of Chilcott silt loam, 4 to 8 percent slopes; Lankbush sandy loam, 4 to 8 percent slopes; Sebree silty clay loam, 4 to 8 percent slopes; and Tenmile very gravelly loam, 4 to 8 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated

crops and pasture and for residential development. The major crops are alfalfa hay, wheat, field corn, corn silage, and sugar beets. Sweet corn and barley are also grown.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the slow permeability, shrink-swell potential, and low strength.

The slow permeability limits the use of this soil as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. In some areas where the substratum is coarse textured, there is a hazard of contaminating nearby water supplies.

The low strength and shrink-swell potential limit the use of this soil as sites for houses. The low strength can affect foundations and other structures that support heavy loads. The shrinking and swelling stresses basement walls; but suitable backfill can help to minimize the stress.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

16-Brent loam, 8 to 12 percent slopes. This soil is very deep and well drained. It formed in acid igneous alluvium on terraces along the Boise Front. The elevation is 2,800 to 4,000 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Included in mapping are small areas of Brent loam, low rainfall, 8 to 12 percent slopes; Lankbush sandy

loam, 4 to 12 percent slopes; and Quincy fine gravelly loamy coarse sand, 4 to 12 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

This soil is best adapted to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The use of this soil for residential development is limited mainly by the low strength, shrink-swell potential, very slow permeability, and slope.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IIIe, nonirrigated.

17-Brent loam, 12 to 30 percent slopes. This soil is very deep and well drained. It formed in acid igneous alluvium on terraces. The elevation is 2,800 to 4,000 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is grayish brown and light brownish gray loam and silt loam 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Included in mapping are small areas of Lankbush sandy loam, 15 to 30 percent slopes, and Quincy fine gravelly loamy coarse sand, 12 to 30 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, this soil is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

This soil is best suited to grazing in spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The slope, low strength, shrink-swell potential, and slow permeability limit this soil for use as sites for residential development.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IVe, nonirrigated.

18-Brent-Haw loams, 8 to 25 percent slopes. The soils in this complex are very deep and well drained. They formed in acid igneous alluvium on terraces in the foothills. The slopes commonly have a northerly aspect. The elevation is 2,800 to 3,200 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Brent loam, and 30 percent is Haw loam. The rest is Ladd loam, 8 to 25 percent slopes; Lankbush sandy loam, 8 to 25 percent slopes; and a soil that is similar to Haw loam but is underlain by sandstone bedrock at a depth of 20 to 60 inches.

Typically, the surface layer of the Brent soil is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly clay loam and gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

Typically, the surface layer of the Haw soil is brown loam about 14 inches thick. The subsoil is yellowish brown and light yellowish brown clay loam about 16 inches thick. The substratum is light gray and white loam and loamy sand to a depth of 60 inches or more.

Permeability of the Haw soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue gradually decrease and are replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedlings are most successful late in fall or early in spring.

The use of these soils for residential development is limited primarily by slope. Slow permeability, shrink-swell potential, low strength, and seepage in the substratum also are limitations to this use.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IVe, nonirrigated.

19-Brent-Ladd loams, 4 to 15 percent slopes. The soils in this complex are very deep and well drained. They are on terraces and colluvial mountain foot slopes. The elevation is 3,000 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Brent loam, and 30 percent is Ladd loam. The rest is Gem silty clay loam, 2 to 15 percent slopes; Day clay, 5 to 15 percent slopes; and Searles fine gravelly loam, 4 to 15 percent slopes.

The Brent soil formed mainly in acid igneous alluvium. It is commonly on terraces that have a northerly aspect. Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The Ladd soil formed mainly in weathered granite and colluvium. It is on colluvial foot slopes that commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches

thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, in the lower foothills, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedlings are most successful late in fall or early in spring.

The use of these soils for residential development is limited primarily by slope. Slow permeability, low strength, shrink-swell potential, and frost action potential also are limitations to this use.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult, unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IIIe, nonirrigated.

20-Brent-Ladd loams, 15 to 30 percent slopes. The soils in this complex are very deep and well drained. They are on terraces and colluvial mountain foot slopes. The elevation is 2,900 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Brent loam, and 30 percent is Ladd loam. The rest is Day clay, 15 to 30 percent slopes; Gem gravelly clay loam, 5 to 40 percent slopes; and Searles gravelly loam, 15 to 30 percent slopes.

The Brent soil formed mainly in acid, igneous alluvium and commonly on terraces that have a northerly aspect. Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Ladd soil formed mainly in weathered granite and colluvium. It is on colluvial foot slopes that commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas in the lower foothills, these soils are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The use of these soils for residential development is limited primarily by slope. The moderately slow and very slow permeability, low strength, and shrink-swell potential also are limitations to this use.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass IVe, nonirrigated.

21-Brent-Searles complex, 15 to 30 percent slopes.

The soils in this complex are on terraces in mountains. The elevation is 3,200 to 4,000 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Brent loam, and 35 percent is Searles gravelly loam. The rest is Ladd loam, 15 to 30 percent slopes; Rock outcrop; and Rainey coarse sandy loam, 15 to 30 percent slopes.

The Brent soil is very deep and well drained. It formed mainly in acid igneous alluvium and is commonly on terraces that have a northerly aspect. Typically, the surface layer is grayish brown and light brownish gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from granitic rock. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; and below that it is very gravelly coarse sandy clay loam about 16 inches thick. It is underlain by weathered granite. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community consists mainly of bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue gradually decrease and are replaced by cheatgrass and other annuals. Big sagebrush, forbs, and Sandberg bluegrass increase.

These soils are best suited to grazing in fall, late in spring, and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedings are most successful late in fall or early in spring.

The use of these soils for residential development is limited primarily by slope. The very slow permeability, low strength, and shrink-swell potential are additional limitations to this use on the Brent soil. Depth to rock is an additional limitation to this use on the Searles soil.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIe, nonirrigated.

22-Cashmere coarse sandy loam, 0 to 4 percent slopes.

This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial fans in the foothills of the Boise Front. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is brown coarse sandy loam about 6 inches thick. The subsoil is grayish brown coarse sandy loam about 9 inches thick. The substratum

is brown coarse sandy loam and loamy coarse sand to a depth of 60 inches or more.

Included in mapping are small areas of Harpt loam, 0 to 4 percent slopes; Jenness fine sandy loam, 0 to 4 percent slopes; and Tindahay fine sandy loam, 0 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow or medium, and the hazard of erosion is slight or moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and residential development. The major crops are alfalfa hay, and wheat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

Slope is the primary limitation to agriculture. Returning crop residue to the surface and minimum tillage can help reduce erosion.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited mainly by the hazard of frost action in the soil. There are few or no other limitations to this use.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

23-Cashmere coarse sandy loam, 4 to 12 percent slopes. This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial fans in the foothills of the Boise Front. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is brown coarse sandy loam about 6 inches thick. The subsoil is grayish brown coarse sandy loam about 9 inches thick. The substratum is brown coarse sandy loam and loamy coarse sand to a depth of 60 inches or more.

Included in mapping are small areas of Tindahay fine sandy loam, 4 to 8 percent slopes; Harpt loam, 4 to 8 percent slopes; and Jenness fine sandy loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available

water capacity is high or very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and residential development. The major crops are alfalfa hay and wheat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Slope is the primary limitation to agriculture. Returning crop residue to the surface and minimum tillage can help reduce erosion. Sprinkling is the most suitable method of irrigation for this soil.

The use of this soil for residential development is limited mainly by slope.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

24-Cashmere coarse sandy loam, 12 to 30 percent slopes. This soil is very deep and well drained. It formed in acid igneous alluvium on alluvial fans in the foothills of the Boise Front. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is brown coarse sandy loam about 6 inches thick. The subsoil is grayish brown coarse sandy loam about 9 inches thick. The substratum is brown coarse sandy loam and loamy coarse sand to a depth of 60 inches or more.

Included in mapping are small areas of Harpt loam, 2 to 4 percent slopes; Jenness fine sandy loam, 2 to 4 percent slopes; and Tindahay fine sandy loam, 4 to 8 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high or very high. Runoff is rapid, and the hazard of erosion is high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suit-

able grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by slope.

This map unit is in capability subclass Vle, nonirrigated.

25-Chance fine sandy loam. This soil is very deep and very poorly drained. It formed in recent alluvium in old river channels and in depressions on the flood plain of the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,400 to 2,600 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically the surface layer is covered by a layer of dark gray, partially decomposed grasses and sedges that is about 1 inch thick. The surface layer is gray fine sandy loam about 8 inches thick. The subsoil is gray fine sandy loam about 8 inches thick. The substratum in the upper part is gray fine sandy loam about 13 inches thick. In the lower part, to a depth of 60 inches or more, it is gray and variegated loamy fine sand and very gravelly fine sand.

Included in mapping are small areas of Bram silt loam and Moulton fine sandy loam. These included soils make up about 5 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is ponded or very slow, and the hazard of erosion is slight. This soil is frequently flooded during periods of high runoff in spring. The seasonal high water table is at a depth of 0 to 10 inches.

In most areas, this soil is used as rangeland and wildlife habitat.

The high water table and the flooding are the major limitations to agriculture. In some areas, this soil is protected from flooding by dikes and levees.

The potential natural plant community on this soil is dominated by tufted hairgrass, sedges, and Baltic rush. If the range deteriorates, woody plants increase.

This soil is best suited to grazing in summer. Range seeding is difficult because of the high water table.

This map unit is in capability subclass Vw.

26-Chardoton stony silty clay loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in loess on old alluvial plains and low alluvial terraces overlying a basalt plain. The elevation is 3,000 to 3,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown stony silty clay loam. The subsoil is brown, light yellowish brown, and pale brown silty clay and clay loam about 21 inches thick. The substratum in the upper 37 inches is

pale brown, very pale brown, and light yellowish brown loam and fine sandy loam. Below that, to a depth of 60 inches or more, it is pale brown silty clay.

Included in mapping are small areas of Bowns stony loam, 0 to 2 percent slopes; Chilcott silt loam, bedrock substratum, 0 to 2 percent slopes; and Kiesel Variant silty clay loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The stones on the surface, slow permeability, and slow rate at which irrigation water enters the soil are the major limitations to agriculture. The stones on the surface impede tillage. Removing the stones improves the suitability of this soil for row crops. The heavy texture of the plow layer limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting. Proper irrigation water management and crop selection are extremely important in overcoming these limitations.

The use of this soil for residential development is limited by the slow permeability, low strength, and shrink-swell potential.

This map unit is in capability subclass IIs, irrigated, and VIc, nonirrigated.

27-Chardoton stony silty clay loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in loess on old alluvial terraces overlying a basalt plain. The elevation is 3,000 to 3,250 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown stony silty clay loam. The subsoil is brown, light yellowish brown, and pale brown silty clay and clay loam about 21 inches thick. The substratum in the upper 37 inches is pale brown, very pale brown, and light yellowish brown

loam and fine sandy loam. Below that, to a depth of 60 inches or more, it is pale brown silty clay.

Included in mapping are small areas of Bowns stony loam, 2 to 4 percent slopes; Chilcott silt loam, bedrock substratum, 2 to 4 percent slopes; and Kiesel Variant silty clay loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The slope, stones on the surface, slow permeability, and slow rate at which irrigation water enters the soil are the major limitations to agriculture. The stones on the surface impede tillage. Removing the stones improves the suitability of this soil for row crops. The heavy texture of the plow layer limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting. Proper irrigation water management and crop selection are extremely important in overcoming these limitations.

The use of this soil for residential development is limited by the slow permeability, low strength, and shrink-swell potential.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

28-Chardoton-Kiesel Variant silty clay loams, 0 to 2 percent slopes. The soils in this complex are very deep and well drained. They are on old alluvial terraces and in filled basins overlying a basalt plain. The elevation is 3,000 to 3,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

About 50 percent of the complex is Chardoton silty clay loam, and 20 percent is Kiesel Variant silty clay loam. The rest is Lankbush sandy loam, Chilcott silt loam, and Sebree silty clay loam.

The Chardoton soil is very deep and well drained. It formed mainly in loess that is underlain by alluvium. Typically, where the soil material to a depth of 7 inches

is mixed, the surface layer is pale brown silty clay loam. The subsoil is brown, light yellowish brown, and pale brown silty clay and clay loam about 21 inches thick. The substratum in the upper part is pale brown and very pale brown loam and fine sandy loam about 37 inches thick. In the lower part, to a depth of 60 inches or more, it is pale brown silty clay.

Permeability of the Chardoton soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

The Kiesel Variant soil is very deep, well drained, and sodium-affected. It formed in silty alluvium in basins. Typically, the surface layer is light yellowish brown silty clay loam about 3 inches thick. The subsoil is dark yellowish brown, yellowish brown, and light yellowish brown clay, silty clay, and clay loam about 15 inches thick. The substratum in the upper part is very pale brown loam about 11 inches thick. In the lower part, to a depth of 60 inches or more, it is very pale brown loam.

Permeability of the Kiesel Variant soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops grown are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chardoton soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Chardoton soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Kiesel Variant soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of slickspots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excessive sodium.

The heavy subsoil and slow permeability are the major limitations to agriculture. The heavy subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting. Regulated irrigation and proper crop selection can help offset these limitations.

The use of these soils for residential development is limited by the slow permeability, shrink-swell potential, and low strength.

This complex is in capability subclass IIc, irrigated, and VIc, nonirrigated.

29-Chardoton-Tindahay complex, 0 to 2 percent slopes. The soils in this complex are on old alluvial terraces in the foothills. The slope is 0 to 2 percent. The elevation is 3,000 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 145 days.

About 40 percent of the complex is Chardoton silty clay loam, and 20 percent is Tindahay fine sandy loam. The rest is Kiesel Variant, silty clay loam, 0 to 2 percent slopes; Jenness fine sandy loam, 0 to 2 percent slopes; and Lankbush sandy loam, 0 to 2 percent slopes.

The Chardoton soil is very deep and well drained. It formed mainly in loess that is underlain by alluvium. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silty clay loam. The subsoil is brown, light yellowish brown, and pale brown silty clay and clay loam about 21 inches thick. The substratum in the upper part is pale brown, very pale brown, and light yellowish brown loam and fine sandy loam about 37 inches thick. In the lower part, to a depth of 60 inches or more, it is pale brown silty clay.

Permeability of the Chardoton soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

The Tindahay soil is very deep and somewhat excessively drained. It formed in moderately coarse textured alluvium. It is on alluvial terraces adjacent to old drainageways. Typically, the surface layer is light brownish gray fine sandy loam about 8 inches thick. The underlying material in the upper 15 inches is light brownish gray and pale brown, fine sandy loam and sandy loam. Below that, to a depth of 60 inches or more, it is light gray loamy coarse sand and variegated fine gravelly loamy coarse sand.

Permeability of the Tindahay soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major irrigated crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Chardoton soil is limited for agriculture mainly by the heavy subsoil and slow permeability. The Tindahay

soil is limited for agriculture mainly by the moderately rapid permeability. The heavy subsoil of the Chardoton soil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting. Land smoothing, followed by deep plowing, to a depth of 2 to 3 feet, can improve the physical characteristics of these soils. Returning crop residue to the soil and turning under green-manure crops help to maintain or increase the content of organic matter.

The Chardoton soil is limited for residential development by the slow permeability, shrink-swell potential, and low strength. The Tindahay soil has few limitations for this use.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

30-Chilcott silt loam, bedrock substratum, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,950 to 3,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick and a very pale brown hardpan about 21 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Bowns stony loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; and Sebree silty clay loam, bedrock substratum, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

This soil is used mainly as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suit-

able grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone and the fine textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

The use of the soil for residential development is limited by the hardpan and underlying bedrock, shrink-swell potential, slow permeability, and low strength.

This map unit is in capability subclass II_s, irrigated, and VI_c, nonirrigated.

31-Chilcott silt loam, bedrock substratum, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,950 to 3,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick and a very pale brown hardpan about 21 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Bowns stony loam, 2 to 4 percent slopes; Elijah silt loam, 2 to 4 percent slopes; and Sebree silty clay loam, 2 to 4 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

This soil is used mainly as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat and alfalfa hay.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suit-

able grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone, the hazard of erosion, and the fine textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The heavy textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

The use of this soil for residential development is limited by the hardpan and underlying bedrock, shrink-swell potential, slow permeability, and low strength.

This map unit is in capability subclass II_e, irrigated, and VI_c, nonirrigated.

32-Chilcott-Brent silt loams, 0 to 2 percent slopes. The soils in this complex are on alluvial terraces. The elevation is 3,100 to 3,300 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 40 percent of the complex is Chilcott silt loam, and 30 percent is Brent silt loam. The rest is Lankbush loam, 0 to 2 percent slopes; Sebree silty clay loam, 0 to 2 percent slopes; Tindahay fine sandy loam, 0 to 2 percent slopes; and a soil that is similar to Purdam silt loam, 0 to 2 percent slopes, but is more than 15 percent sand at a depth of 10 to 40 inches.

The Chilcott soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick, a very pale brown hardpan about 9 inches thick, and to a depth of 60 inches or more, light yellowish brown and variegated sandy loam and coarse sand. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Brent soil is very deep and well drained. It formed in acid igneous alluvium. Typically, the surface layer is grayish brown and light gray silt loam and loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for

irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The slow and very slow permeability and a fine textured subsoil are limitations to agriculture on these soils. The heavy textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting. The hardpan is an additional limitation to agriculture on the Chilcott soil. It hinders the growth of some deep-rooted crops and limits the available water capacity of the soil.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers, thus improving the physical characteristics of the soil.

The use of these soils for residential development is limited by the slow and very slow permeability, low strength, and shrink-swell potential. The hardpan is an additional limitation to this use on the Chilcott soil.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

33-Chilcott-Brent complex, 2 to 8 percent slopes.

The soils in this complex are on alluvial terraces. The elevation is 3,100 to 4,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 60 percent of the complex is Chilcott silt loam, and 30 percent is Brent loam. The rest is Jenness fine sandy loam, 0 to 4 percent slopes, and Tindahay fine sandy loam, 0 to 8 percent slopes.

The Chilcott soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick, a very pale brown hardpan about 9 inches thick, and to a depth of 60 inches or more, light yellowish brown and variegated sandy loam and coarse sand. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Brent soil is very deep and well drained. It formed in acid igneous alluvium. Typically, the surface layer is grayish brown and light gray loam and silt loam about 18 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam;

below that, to a depth of 60 inches or more, it is gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The slow or very slow permeability and the fine-textured subsoil are major limitations to agriculture on these soils. The fine-textured material in the plow layer limits the growth of potatoes, sugar beets, and other root crops. Hardpan, the moderate hazard of erosion, and slope also are major limitations to agriculture on the Chilcott soil. The hardpan hinders the growth of some deep-rooted crops. The moderate hazard of erosion and slope limit some cultivation and irrigation practices.

The use of these soils for residential development is limited by the shrink-swell potential, slow permeability, and low strength. Hardpan is an additional limitation to this use on the Chilcott soil.

This complex is in capability subclass IIIe, irrigated, and VIc, nonirrigated.

34-Chilcott-Sebree complex, 0 to 2 percent slopes. The soils in this complex are on high alluvial terraces. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 60 percent of the complex is Chilcott silt loam, and 30 percent is Sebree silty clay loam. The rest is

Elijah silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; and soils that are similar to Chilcott silty clay loam, 0 to 2 percent slopes, and Sebree silty clay loam, 0 to 2 percent slopes, but have a weakly cemented hardpan.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Chilcott soil is moderately deep over hardpan, and it is well drained. It formed mainly in loess over silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick, a very pale brown hardpan about 9 inches thick, and, to a depth of 60 inches or more, light yellowish brown and variegated sandy loam and coarse sand. Depth to the pan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Sebree soil is moderately deep to a hardpan, and well drained and sodium affected. It formed in loess or silty alluvium that is underlain by mixed alluvium. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick, a white hardpan about 8 inches thick, and, to a depth of 60 inches or more, variegated sand and gravel. Depth to the pan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcott soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Chilcott soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of low moisture intake and excessive sodium.

The hardpan and the heavy textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The heavy textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers, thus improving the physical characteristics of the soil.

The use of these soils for residential development is limited mainly by the cemented hardpan, slow permeability, shrink-swell potential, and low strength.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

35-Chilcott-Sebree complex, 2 to 4 percent slopes.

The soils in this complex are on high alluvial terraces. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 55 percent of the complex is Chilcott silt loam, and 25 percent is Sebree silty clay loam. The rest is Elijah loam, 2 to 4 percent slopes, and soils that are similar to Chilcott silt loam, 2 to 4 percent slopes, and Sebree silty clay loam, 2 to 4 percent slopes, but have a weakly cemented pan.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Chilcott soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 9 inches thick and below that, to a depth of 60 inches or more, light yellowish brown and variegated sandy loam and coarse sand. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by mixed alluvium. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick, a white hardpan about 8 inches thick, and, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is very high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcott soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Chilcott soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of low moisture intake and excessive sodium.

Slope, the hardpan, and the heavy textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers and improves the physical characteristics of the soils.

The use of these soils for residential development is limited by the hardpan, slow permeability, shrink-swell potential, and low strength.

This complex is in capability subclass IIe, irrigated, and VIc, nonirrigated.

36-Chilcott-Sebree complex, 4 to 8 percent slopes.

The soils in this complex are on broad side slopes of dissected alluvial terraces. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 55 percent of the complex is Chilcott silt loam, and 25 percent is Sebree silty clay loam. The rest is Tenmile very gravelly loam, 4 to 12 percent slopes; Brent loam, 4 to 15 percent slopes; and soils that are similar to Chilcott silt loam and Sebree silty clay loam but have a weakly cemented pan.

The Chilcott soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick, a very pale brown hardpan about 9 inches thick, and, to a depth of about 60 inches or more, light yellowish brown and variegated sandy loam and coarse sand. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by mixed alluvium. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick, a white hardpan about 8 inches thick, and, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcott soil is mainly bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Chilcott soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of low moisture intake and excessive sodium.

The depth of the root zone and the fine-textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers and thus improves the physical characteristics of the soil.

The use of these soils for residential development is limited by the slow permeability, cemented hardpan, shrink-swell potential, and low strength.

This complex is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

37-Chilcott-Sebree complex, bedrock substratum, 0 to 2 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 60 percent of the complex is Chilcott stony silt loam, and 20 percent is Sebree stony silty clay loam. The rest is Brent loam, 0 to 2 percent slopes; Chardoton stony silty clay loam, 0 to 2 percent slopes; and Power silt loam, 0 to 2 percent slopes.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Chilcott soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown stony silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick and below that, a very pale brown hardpan

about 21 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown stony silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and below that, a white hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan is 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcott soil is mainly bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush and Thurber needlegrass increase.

This Chilcott soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of the slowly permeable subsoil and excessive sodium.

The hardpan and the fine-textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Re-

stricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers and thus improves the physical characteristics of the soil.

The use of these soils for residential development is limited by the hardpan and the underlying bedrock, shrink-swell potential, slow permeability, and low strength.

This complex is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

38-Chilcote-Seabee complex, bedrock substratum, 2 to 4 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 55 percent of the complex is Chilcote stony silt loam, and 25 percent is Seabee stony silty clay loam. The rest is McCain silt loam, 2 to 4 percent slopes; Chardot stony silty clay loam, 2 to 4 percent slopes; and Power silt loam, 2 to 4 percent slopes.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Chilcote soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown stony silt loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick and below that, a very pale brown hardpan about 21 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcote soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Seabee soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown, stony silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and, below that, a white hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Seabee soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for

irrigated crops and pasture and for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcote soil is mainly bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush and Thurber needlegrass increase.

This Chilcote soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Seabee soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of low moisture intake and excessive sodium.

The hardpan and the fine-textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers and thus improves the physical characteristics of the soil.

The use of these soils for residential development is limited by the hardpan and the underlying bedrock, shrink-swell potential, slow permeability, and low strength.

This complex is in capability subclass IIe, irrigated, and VIc, nonirrigated.

39-Chilcote-Seabee complex, bedrock substratum, 4 to 8 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 55 percent of the complex is Chilcote stony silty clay loam, and 25 percent is Seabee stony silty clay loam. The rest is Bowns stony loam, 0 to 8 percent slopes; Brent loam, 4 to 8 percent slopes; and McCain extremely stony silt loam, 4 to 8 percent slopes.

The Chilcote soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface

layer is pale brown, stony silty clay loam about 9 inches thick. The subsoil is brown silty clay about 6 inches thick. The substratum consists of very pale brown loam about 11 inches thick and a very pale brown hardpan about 21 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Chilcott soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown stony silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and below that, a white hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture or for residential development. The major crops are field corn, corn silage, wheat, and alfalfa hay.

The potential natural plant community on the Chilcott soil is mainly bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush and Thurber needlegrass increase.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of the subrounded areas. This soil has very limited potential for producing forage under natural conditions because of low moisture intake and excessive sodium.

The hardpan and the fine-textured subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured subsoil limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to increase and maintain the

content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration. Restricting tillage operations to favorable soil moisture levels helps maintain soil structure. Deep plowing, to a depth of 2 or 3 feet, mixes the soil layers and thus improves the physical characteristics of the soil.

The use of these soils for residential development is limited by the hardpan and the underlying bedrock, shrink-swell potential, slow permeability, and low strength.

This complex is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

40-Colthorp silt loam, 0 to 2 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Included in mapping are small areas of Chilcott silt loam, Elijah silt loam, and Power silt loam. These included soils make up about 10 percent of this map unit.

Typically, the surface layer is pale brown silt loam about 4 inches thick. The subsoil is brown silty clay loam about 4 inches thick. The substratum consists of a layer of light yellowish brown silt loam and a layer of very pale brown loam that have a combined thickness of about 11 inches; below these layers it consists of a white hardpan about 9 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability is moderately slow. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is very slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland or for residential development.

The shallowness of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset this limitation.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to

crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. Late in summer and early in fall the low available water capacity limits plant growth. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The construction of houses without basements is limited by the hardpan. The construction of houses with basements is severely limited by the hardpan and the underlying bedrock.

The use of this soil as septic tank absorption fields is limited by the shallowness to the hardpan and the underlying bedrock, which impede the downward movement of the effluent. This limitation can generally be offset by using sufficient fill above the hardpan to provide an effective filtering zone.

Digging and trenching are hampered by the hardpan and the underlying bedrock. The construction of roads and streets is also hampered by the hardpan.

This map unit is in capability subclass IVs, irrigated, and VIs, nonirrigated.

41-Colthorp silt loam, 2 to 4 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Included in mapping are small areas of Chilcott silt loam, Elijah silt loam, and Power silt loam. The included soils make up about 10 percent of this map unit.

Typically, the surface layer is pale brown silt loam about 4 inches thick. The subsoil is brown silty clay loam about 4 inches thick. The substratum consists of a layer of light yellowish brown silt loam and a layer of very pale brown loam that have a combined thickness of about 11 inches; below these layers it consists of a white hardpan about 9 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability is moderately slow. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland or for residential development.

The shallowness of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset this limitation.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and

pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The construction of houses without basements is limited by the hardpan. The construction of houses with basements is severely limited by the hardpan and the underlying bedrock.

The use of this soil as septic tank absorption fields is limited by the shallowness to the hardpan and the underlying bedrock, which restrict the downward movement of effluent. This limitation can generally be offset by using sufficient fill above the hardpan to provide an effective filtering zone.

Digging and trenching are hampered by the hardpan and the underlying bedrock. The construction of roads and streets is hampered by the hardpan.

This map unit is in capability subclass IVe, irrigated, and VIs, nonirrigated.

42-Colthorp cobbly loam, 0 to 2 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown cobbly loam about 4 inches thick. The subsoil is brown silty clay loam about 4 inches thick. The substratum consists of a layer of light yellowish brown silt loam and a layer of very pale brown loam that have a combined thickness of about 11 inches; below these layers it consists of white hardpan about 9 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of soils that are similar to the Colthorp soil because they have a cobbly surface layer; otherwise, they are similar to Chilcott silt loam, Elijah silt loam, and Power silt loam. They make up about 10 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is very slow, and the hazard of erosion is slight.

In most areas, this soil is used mainly for irrigated pasture. It is also used for irrigated crops, including field corn, corn silage, wheat, alfalfa hay, sweet corn, barley,

oats, and mint. In some areas, this soil is used for range or for residential development.

The shallowness of the root zone, the low available water capacity, and the cobbles and stones are the major limitations to cultivation. The hardpan hinders the growth of some deep-rooted crops, and limits the available water capacity of the soil. The surface layer is about 20 percent cobbles, and there are enough stones on the surface to impede tillage. The stones and cobbles further reduce the available water capacity. If the stones and cobbles are not removed, this soil is best suited to permanent pasture; if they are removed, the soil is best suited to the cultivated crops common to the area. Proper crop selection and irrigation water management are needed to overcome the limitations.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, the bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. Late in summer and early fall, the low available water capacity limits plant growth. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

The construction of houses without basements is limited by the cemented hardpan. The construction of houses with basements is severely limited by the cemented hardpan and the underlying bedrock.

The use of this soil as septic tank absorption fields is limited by the shallowness to the hardpan and the underlying bedrock, which restrict the downward movement of effluent. This limitation can generally be overcome by using sufficient fill material above the hardpan to provide an effective filtering zone.

Digging and trenching are hampered by the hardpan and the underlying bedrock. The construction of roads and streets is hampered mainly by the shallowness to the hardpan.

This map unit is in capability subclass IVs, irrigated, and VIs, nonirrigated.

43-Colthorp cobbly loam, 2 to 4 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,500 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Included in mapping are small areas of soils that are similar to Chilcott silt loam, Elijah silt loam, and Power silt loam but have a cobbly surface layer. These included soils make up about 10 percent of this map unit.

Typically, the surface layer is pale brown cobbly loam about 4 inches thick. The subsoil is brown silty clay loam

about 4 inches thick. The substratum consists of light yellowish brown silt loam and very pale brown loam about 11 inches thick and a white hardpan about 9 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability is moderately slow. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight. The root zone extends to a depth of 10 to 20 inches.

In most areas, this soil is used for irrigated crops and mainly for irrigated pasture. The major crops are field corn, corn silage, wheat, alfalfa hay, sweet corn, barley, oats, and mint. In some areas, this soil is used as rangeland or for residential development.

The shallowness to the root zone, the hazard of erosion, the low available water capacity, and the cobbles and stones are the major limitations to cultivation. The hardpan hinders the growth of some deep-rooted crops and limits the available water capacity. The surface layer is about 20 percent cobbles, and there are enough stones on the surface to impede tillage. These stones and cobbles further reduce the available water capacity. If the stones and cobbles are not removed, this soil is best suited to permanent pasture; if they are removed, this soil is best suited to the cultivated crops common to the area. Proper crop selection and irrigation water management are needed to offset these limitations.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, the bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early fall, the low available water capacity limits plant growth.

The use of this soil for residential development is limited mainly by the shallowness to the cemented hardpan and the underlying bedrock.

The construction of houses without basements is limited by the hardpan. The construction of houses with basements is severely limited by the hardpan and the underlying bedrock.

The shallowness to the hardpan and underlying bedrock, which restrict the downward movement of effluent, limit this soil for use as septic tank absorption fields. This limitation can generally be offset by using sufficient fill above the hardpan to provide an effective filtering zone. The construction of roads and streets is hampered by the hardpan.

This map unit is in capability subclass IVe, irrigated, and VIs, nonirrigated.

44-Day clay, 5 to 15 percent slopes. This soil is very deep and well drained. It formed in sediments that derived from tuff and volcanic ash. It is on terraces. The elevation is 2,800 to 3,500 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is reddish brown and dark reddish gray clay about 39 inches thick. The underlying material is reddish brown clay and silty clay to a depth of 60 inches or more.

Included in mapping are small areas of Ada gravelly sandy loam, 4 to 15 percent slopes; Brent loam, 8 to 12 percent slopes; Gem silty clay loam, 2 to 15 percent slopes; and Ladd loam, 4 to 15 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Sandberg bluegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Sandberg bluegrass decrease and are gradually replaced by medusahead wildrye.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, sweetclover, or other suitable plants. There is a significant chance of seeding failure because of severe competition from annuals and because of soil characteristics that hamper preparation of the seedbed. Seedlings are most successful late in fall or early in spring. Deep, wide cracks develop in this soil late in summer; they can be hazardous to livestock.

The use of this soil for residential development is limited by the shrink-swell potential, very slow permeability, low strength, and slope.

Construction sites without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass VIe, nonirrigated.

45-Day clay, 15 to 30 percent slopes. This soil is very deep and well drained. It is on terraces. It formed in

sediments that derived from tuff and volcanic ash. The elevation is 2,800 to 3,500 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is reddish brown and dark reddish gray clay about 39 inches thick. The underlying material is reddish brown clay and silty clay to a depth of 60 inches or more.

Included in mapping are small areas of Ada gravelly sandy loam, 15 to 30 percent slopes; Brent loam, 12 to 30 percent slopes; Gem silty clay loam, 5 to 40 percent slopes; and Ladd loam, 15 to 30 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas in the lower foothills, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Sandberg bluegrass, and big sagebrush. If the range deteriorates, the perennial grasses decrease and are gradually replaced by medusahead wildrye.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, sweetclover, or other suitable plants. There is a significant chance of seeding failure because of severe competition from annuals and because of soil characteristics that hamper preparation of the seedbed. Seedlings are most successful late in fall or early in spring. Deep, wide cracks develop in this soil late in summer; they can be hazardous to livestock.

The use of this soil for residential development is limited by the shrink-swell potential, very slow permeability, low strength, and slope.

Construction sites that are left without adequate soil cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff is recommended if construction sites must be left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass VIe, nonirrigated.

46-Drax loam. This soil is very deep and moderately well drained. It formed in dominantly acid igneous alluvium on low terraces adjacent to the Boise River and other major drainages. The slope ranges from 0 to 2 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and brown loam about 12 inches thick. The underlying material in the upper part is pale brown heavy loam about 5 inches thick. In the lower part it is grayish brown, pale brown, light brownish gray, and light gray silty clay loam, clay loam, fine sandy loam, and sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Beetville fine sandy loam; Bissell loam, 0 to 2 percent slopes; and Jenness fine sandy loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great. The water table is at a depth of 4 to 6 feet during the peak of the irrigation season.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for urban development.

The seasonal high water table can hinder the growth of alfalfa, sugar beets, and other deep-rooted crops. Although it is the primary limitation of this soil for agriculture, it is not a major problem; but it should be considered in irrigation water management.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by wetness, flooding, moderately slow permeability, low strength, and potential frost action.

The seasonal high water table limits this soil for use as septic tank absorption fields. If effluent is discharged into the water table, particularly in high density residential areas, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter material above the water table with fill material can help to reduce this hazard. Connection to a closed community sewer system is an alternative if a facility is available.

Digging and trenching are hampered by the seasonal high water table. It may be necessary to use pumps at excavation sites in summer.

The seasonal high water table is a limitation to the use of this soil as sites for houses with basements unless drainage is provided. Crawl spaces under houses without basements may become saturated during the peak of the irrigation season.

The low strength of the soil and the hazard of frost action in the soil limit this soil for use as sites for streets, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability class I, irrigated.

47-Drax-Goose Creek-Urban land complex. The soils and the Urban land in this complex are on low terraces adjacent to the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,600 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 30 percent of the complex is Drax loam, 30 percent is Goose Creek loam, and 25 percent is Urban land. The rest is Bissell loam, 0 to 2 percent slopes, and Cashmere coarse sandy loam, 0 to 4 percent slopes.

The Drax soil is very deep and moderately well drained. It formed mainly in dominantly acid igneous alluvium. Typically, the surface layer is grayish brown and brown loam about 12 inches" thick. The underlying material in the upper part is pale brown heavy loam about 5 inches thick. In the lower part it is grayish brown, pale brown, light brownish gray, and light gray silty clay loam, clay loam, fine sandy loam, and sandy loam to a depth of 60 inches or more.

Permeability of the Drax soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great.

The Goose Creek soil is very deep and somewhat poorly drained. It formed mainly in acid igneous alluvium. Typically, the surface layer in the upper 14 inches is dark gray loam; below that, to a depth of about 6 inches, it is dark gray clay loam. The underlying material is dark gray, gray, and grayish brown loam and clay loam to a depth of about 60 inches.

Permeability of the Goose Creek soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Flooding is a hazard only if the amount of precipitation is unusually great.

The Urban land consists of areas that are covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

The soils in this complex are used mainly for residential and urban development.

Wetness, flooding, moderately slow permeability, potential frost action, shrink-swell potential, and low strength are the major limitations to residential development.

The seasonal high water table and flooding limit the soils for use as septic tank filter fields. If effluent is discharged into the water table, particularly in high density residential areas, contamination of nearby water supplies is a hazard. Increasing the thickness of unsaturated filter material above the water table with suitable fill material can help to reduce this hazard. Connection to a closed community sewer system is an alternative. Wetness limits these soils for use as sewage lagoons.

Digging and trenching are hampered by the seasonal high water table. It may be necessary to use pumps at

excavation sites in summer. The seasonal high water table is a limitation to the use of the soils as sites for houses with basements unless drainage is provided. Crawl spaces under houses without basements may become saturated during the peak of the irrigation season.

Low strength and frost action potential limit the use of the soils in this complex as sites for streets, driveways, and other paved surfaces. The shrink-swell potential and seasonal high water table are additional limitations to this use on the Goose Creek soil.

Wetness is the major limitation to agriculture. The seasonal high water table restricts the growth of some deep-rooted crops. It can also impede farm implements. Tile drains can be used to lower the water table if an adequate outlet is available.

This complex is in capability subclass IIw, irrigated.

48-Elijah silt loam, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on intermediate alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick and a light gray hardpan about 12 inches thick. Variegated sand and gravel underlie the hardpan and extend to a depth of 60 inches or more. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Pipeline silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; Purdam silt loam, 0 to 2 percent slopes; Sebree silty clay loam, 0 to 2 percent slopes; and Urban land. These inclusions make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corru-

gation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the pan, low strength, and hazard of frost action.

The moderate depth to the hardpan, which impedes the downward movement of the effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited. If effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard, particularly in high density residential areas.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIc, irrigated, and VIc, nonirrigated.

49-Elijah silt loam, 2 to 4 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on intermediate alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick, a light gray hardpan about 12 inches thick, and below that, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Pipeline silt loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; Purdam silt loam, 2 to 4 percent slopes; Sebree silty clay loam, 2 to 4 percent slopes; and Urban land. These inclusions make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the hardpan, low strength, and hazard of frost action.

The depth to the hardpan, which restricts the downward movement of the effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited. If effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard, particularly in high density residential areas.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

50-Elijah silt loam, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It

formed in loess or silty alluvium that is underlain by mixed alluvium. It is on intermediate alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick, a light gray hardpan about 12 inches thick, and below that, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Pipeline silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; Purdam silt loam, 4 to 8 percent slopes; Sebree silty clay loam, 4 to 8 percent slopes; and Urban land. These inclusions make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall.

In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the cemented pan, low strength, and hazard of frost action.

The depth to the hardpan, which restricts the downward movement of the effluent, limits this soil for use as septic tank absorption fields. This limitation can generally

be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited. If effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard, particularly in high density residential areas.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

51-Elijah silt loam, bedrock substratum, 0 to 2 percent slopes. This soil is moderately deep to a hardpan and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick and a light gray hardpan about 12 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Colthorp silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the hardpan and the underlying bedrock, the low strength, and the hazard of frost action.

The depth to the hardpan and the underlying bedrock, which restrict the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited.

Digging and trenching are hampered by the hardpan and the underlying bedrock.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan and underlying bedrock.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

52-Elijah silt loam, bedrock substratum, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick and a light gray hardpan about 12 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Colthorp silt loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; and Sebree silty clay loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage,

sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the hardpan and the underlying bedrock, the low strength, and the hazard of frost action.

The depth to the hardpan and the underlying bedrock, which restrict the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited.

Digging and trenching are hampered by the hardpan and the underlying bedrock.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan and underlying bedrock.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

53-Elijah silt loam, bedrock substratum, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5

inches thick and a light gray hardpan about 12 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Colthorp silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; and Sebree silty clay loam, 4 to 8 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and as wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the hardpan and the underlying bedrock, the low strength, and the hazard of frost action.

The depth to the hardpan and the underlying bedrock, which restrict the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be constructed if space is limited.

Digging and trenching are hampered by the hardpan and the underlying bedrock.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan and underlying bedrock.

The low strength of the soil and a hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass Ille, irrigated, and Vle, nonirrigated.

54-Elijah-Urban land complex, 0 to 2 percent slopes. The soils and Urban land in this complex are on intermediate terraces. The elevation is 2,600 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 65 percent of the complex is Elijah silt loam, and 25 percent is Urban land. The rest is Abo silt loam.

The Elijah soil is moderately deep to a hardpan, and it is well drained. It formed mainly in loess and silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is yellowish brown and brown silty clay loam about 15 inches thick. The substratum consists of very pale brown loam about 5 inches thick, a light gray hardpan about 12 inches thick, and below that, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from 20 to 40 inches.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Urban land consists of land that is covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

The Elijah soil is used primarily for residential and urban development. It is limited for this use primarily by the hardpan, hazard of frost action, and low strength.

The depth to the hardpan, which restricts the downward movement of effluent, limits the Elijah soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment.

The Elijah soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can offset these limitations.

This complex is in capability subclass IIs, irrigated.

55-Falk fine sandy loam. This soil is very deep and somewhat poorly drained. It formed in recent alluvium of dominantly acid igneous origin. It is on low alluvial terraces adjacent to the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,400 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and light brownish gray fine sandy loam about 8 inches thick. The underlying material in the upper part is pale brown fine sandy loam about 18 inches thick. In the lower part it is pale brown and variegated very gravelly coarse sandy loam and very gravelly sand to a depth of 60 inches or more.

Included in mapping are small areas of Moulton fine sandy loam and Notus soils. These included soils make up about 10 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight. This soil is subject to rare flooding.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used for residential and urban development.

The water table, which is at a depth of 3 to 5 feet during the peak of the irrigation season, is the primary limitation to agriculture. If the amount of runoff received from other areas is unusually great, this soil may flood. In some areas, this soil is protected by dikes and levees.

The use of this soil for residential development is limited primarily by the flood hazard.

The use of this soil as septic tank absorption fields is severely limited by the seasonal high water table. If effluent is discharged into this water table, particularly in high density residential areas, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter material above the water table with suitable material can help to reduce this hazard. Connection to a closed community sewer system is an alternative if a facility is available.

Digging and trenching are hampered by the seasonal high water table. It may be necessary to use pumps at excavation sites in summer. Cutbanks may collapse if excavations extend into the coarse textured alluvium.

The seasonal high water table is a limitation to the use of this soil as sites for houses with basements unless drainage is provided. Crawl spaces under houses without basements may become saturated during the peak of the irrigation season.

This soil is in capability subclass Ilw, irrigated.

56-Falk-Moulton-Urban land complex. The soils and Urban land in this complex are on low alluvial terraces adjacent to the Boise River. The slope ranges from 0 to 2 percent. The elevation is 2,500 to 2,800 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 35 percent of the complex is Falk fine sandy loam, 25 percent is Moulton fine sandy loam, and 20 percent is Urban land. The rest is Chance fine sandy loam, Goose Creek loam, and Notus soils.

The Falk soil is very deep and somewhat poorly drained. It formed mainly in acid igneous alluvium. Typi-

cally, the surface layer is grayish brown and light brownish gray fine sandy loam about 8 inches thick. The underlying material in the upper part is pale brown fine sandy loam about 18 inches thick. In the lower part it is pale brown and variegated very gravelly coarse sandy loam and very gravelly sand to a depth of 60 inches or more.

Permeability of the Falk soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight. This soil may flood if the amount of runoff is abnormally great. The water table is at a depth of 3 to 5 feet.

The Moulton soil is very deep and poorly drained. It formed mainly in acid igneous alluvium. Typically, the surface layer is grayish brown fine sandy loam about 12 inches thick. The subsoil is light brownish gray fine sandy loam about 12 inches thick. The substratum is light brownish gray fine sandy loam in the upper 11 inches; below that, to a depth of 60 inches or more, it is grayish brown very gravelly loamy sand.

Permeability of this Moulton soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high or very high. Runoff is ponded or very slow, and the hazard of erosion is slight. This soil may flood if the amount of runoff is abnormally great.

The Urban land consists of areas that are covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

Areas of this complex are used mainly for residential and urban development. A few areas are farmed.

The seasonal water table, flood hazard, unstable cut banks, hazard of frost action, and hazard of seepage are the major limitations to residential and urban development.

The seasonal water table severely limits the soils for use as septic tank absorption fields. If effluent is discharged into the water table, particularly in high density residential areas, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter material above the water table with suitable material can reduce this hazard. Connection to a closed community sewer system is an alternative if a facility is available.

Wetness and the hazard of seepage are the primary limitations to the use of the soils as sites for sewage lagoons.

Digging and trenching are hampered by the seasonal water table. It may be necessary to use pumps at excavation sites in summer. Cutbanks may collapse if excavations extend into the coarse textured alluvium.

The seasonal water table is a limitation to the use of the soils as sites for houses with basements unless drainage can be provided. Crawl spaces under houses without basements may become saturated during the peak of the irrigation season.

Wetness is the major limitation to agriculture. The water table restricts the growth of some deep-rooted crops and can impede farm implements. Tile drains can be used to lower the water table if an adequate outlet is available.

This complex is in capability subclass IIIw, irrigated.

57-Feltham loamy sand, 0 to 3 percent slopes. This soil is very deep and somewhat excessively drained. It formed in alluvium modified by wind. It is on terraces and alluvial fans. The elevation is 2,300 to 3,100 feet. The average annual precipitation is 8 inches in areas that are near the Snake River and 12 inches in areas that are in the northern part of the survey area. The average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light yellowish brown loamy sand about 7 inches thick. The underlying material is very pale brown and light yellowish brown loamy sand, sandy loam, fine sand, and fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Jenness fine sandy loam, 0 to 4 percent slopes; Power silt loam, 0 to 4 percent slopes; Purdam silt loam, 0 to 4 percent slopes; and Turbyfill fine sandy loam. These included soils make up about 15 percent of the map unit.

Permeability is rapid in the upper part of the profile and moderately rapid in the lower part. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Barley and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat.

The rapid permeability is the major limitation to agriculture. Returning crop residue to the soil and turning under green manure crops help to maintain the content of organic matter.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the intake rate, accelerated erosion will occur.

The potential natural plant community on this soil is dominated by big sagebrush, needleandthread, and Indian ricegrass. If the range deteriorates, dunes develop.

This soil is best suited to grazing in winter and early in spring. Proper management of grazing is essential to maintain the condition of the range plants and to keep the soil stable. If the range is in poor condition, it can be reseeded to Indian ricegrass and other suitable grasses. Seedlings are most successful late in fall or in mid-winter. There is a very high chance of seeding failure because of droughtiness and an unstable seedbed.

This map unit is in capability subclass IVe, irrigated, and VIIe, nonirrigated.

58-Feltham loamy sand, 3 to 12 percent slopes.

This soil is very deep and somewhat excessively drained. It formed in alluvium modified by wind. It is on terraces and alluvial fans. The elevation is 2,300 to 3,100 feet. The average annual precipitation is 8 inches in areas that are near the Snake River and 12 inches in areas that are in the northern part of the survey area. The average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light yellowish brown loamy sand about 7 inches thick. The underlying material is very pale brown and light yellowish brown loamy sand, sandy loam, fine sand, and fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Power silt loam, 4 to 12 percent slopes; Purdam silt loam, 4 to 8 percent slopes; and Turbyfill fine sandy loam, 2 to 4 percent slopes. These included soils make up about 15 percent of the map unit.

Permeability is rapid in the upper part of the profile and moderately rapid in the lower part. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow or medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Barley and potatoes are also grown. In some areas, the soil is used as rangeland and wildlife habitat.

The hazard of erosion and the rapid permeability are the major limitations to agriculture. These limitations can be overcome by returning crop residue to the soil and turning under green manure crops to help maintain the content of organic matter.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by big sagebrush, Indian ricegrass, and needleandthread. If the range deteriorates, dunes develop.

This soil is best suited to limited grazing early in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass and other suitable grasses, but there is a very high chance of seeding failure because of droughtiness and an unstable seedbed. Seedlings are most successful late in fall.

If this soil is used as rangeland, a planned grazing system is essential to maintain or improve the condition of the range and to prevent wind erosion.

This soil is in capability subclass IVe, irrigated, VIIe, nonirrigated.

59-Feltham-Rubble land complex, 0 to 10 percent slopes. The soil and Rubble land in this complex are on

alluvial fans at the base of the Snake River bluffs. The elevation is 2,300 to 2,500 feet. The average annual precipitation is 8 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 55 percent of the complex is Feltham loamy sand, and 35 percent is Rubble land. The rest is Quincy sand, 2 to 8 percent slopes.

The Feltham soil is very deep and well drained. It formed mainly in alluvium modified by wind. Typically, the surface layer is light yellowish brown loamy sand about 7 inches thick. The underlying material is very pale brown and light yellowish brown loamy sand, sandy loam, fine sand, and fine sandy loam to a depth of 60 inches or more.

Permeability of the Feltham soil is rapid in the upper part of the profile and moderately rapid in the lower part. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow through medium, and the hazard of erosion is slight through moderate.

The Rubble land consists of areas of stones and boulders that derived from the bluffs, which are composed of highly jointed basalt. The stones and boulders are well rounded and are 1 to 40 feet in diameter. Rubble land is free of vegetation except for lichens.

Areas of this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on the Feltham soil is dominated by Indian ricegrass, needleandthread, and big sagebrush. If the range deteriorates, the perennial vegetation decreases and is gradually replaced by annual grasses and forbs.

The soil is best suited to limited grazing early in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass and other suitable grasses, but there is a very high chance of seeding failure because of droughtiness and an unstable seedbed. Seedlings are most successful late in fall.

If the soil is used as rangeland, a planned grazing system is essential to maintain or improve the condition of the range and to prevent wind erosion.

This complex is in capability subclass VIIe, nonirrigated.

60-Garbutt silt loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium on basalt plains and alluvial fans. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The underlying material in the upper part is very pale brown silt loam and very fine sandy loam about 32 inches thick. In the lower part it is very pale brown silt loam to a depth of 60 inches or more.

Included in mapping are small areas of Potratz silt loam, 0 to 2 percent slopes; Scism silt loam, 0 to 2

percent slopes; and Scism silt loam, bedrock substratum, 0 to 2 percent slopes. These included soils make up about 15 percent of the map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is high.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

This soil has few limitations to agriculture. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bottlebrush squirrel tail, and winterfat. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate and there is a high chance of seeding failure.

The use of this soil for urban and residential development is limited by the low strength of the soil and a hazard of frost action in the soil. In general, however, this soil is well suited to use as sites for houses with and without basements.

The low strength of the soil and hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability class I, irrigated, and subclass VIc, nonirrigated.

61-Garbutt silt loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium on basalt plains and alluvial fans. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The underlying material in the upper part is very pale brown silt loam and very fine sandy loam about 32 inches thick. In the lower part, it is very pale brown silt loam to a depth of 60 inches or more.

Included in mapping are small areas of Potratz silt loam, 2 to 4 percent slopes; Scism silt loam, 2 to 4 percent slopes; and Scism silt loam, bedrock substratum, 2 to 4 percent slopes. The included soils make up about 15 percent of the map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion is the major limitation to agriculture. Erosion can be controlled through proper management of irrigation water. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bottlebrush squirrel tail, and winterfat. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate and there is a high chance of seeding failure.

The use of this soil for urban and residential development is limited by the low strength of the soil and a hazard of frost action in the soil. In general, however, this soil is well suited to use as sites for houses with and without basements.

The low strength of the soil and hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

62-Garbutt silt loam, 4 to 8 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium on basalt plains and alluvial fans. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The underlying material in the upper part is very pale brown silt loam and very fine sandy loam about 32 inches thick. In the lower part, it is very pale brown silt loam to a depth of 60 inches or more.

Included in mapping are small areas of Potratz silt loam, 4 to 8 percent slopes; Scism silt loam, 4 to 8 percent slopes; and Scism silt loam, bedrock substratum, 4 to 8 percent slopes. These included soils make up about 15 percent of the map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion is the major limitation to agriculture. Erosion can be controlled through proper management of irrigation water. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bottlebrush squirrel tail, and winterfat. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate and there is a high chance of seeding failure.

The use of this soil for urban and residential development is limited by the low strength of the soil and the hazard of frost action in the soil. In general, however, this soil is well suited to use as sites for houses with and without basements.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

63-Gem silty clay loam, 2 to 15 percent slopes.

This soil is moderately deep and well drained. It is on

basalt plains and in areas where basalt outcrops along the Boise Front. It formed in material that weathered from basalt, tuff, and volcanic ash and that is covered by loess in some areas. The elevation is 2,900 to 4,200 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is dark brown silty clay loam. The subsoil is dark grayish brown, brown, and pale brown clay loam and clay about 11 inches thick. The substratum is very pale brown gravelly loam about 5 inches thick. It is underlain by highly fractured, weathered basalt. Depth to the bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Ada gravelly sandy loam, 4 to 15 percent slopes; Brent loam, 8 to 12 percent slopes; Ladd loam, 4 to 15 percent slopes; and Lankbush sandy loam, 4 to 12 percent slopes. These included soils make up about 15 percent of the map unit.

Permeability is slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is moderately rapid or rapid, and the hazard of erosion is moderate or high.

In most areas, this soil is used as rangeland and wildlife habitat. In a few areas, it is dry-farmed to winter wheat or alfalfa hay. In some areas, it is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedlings are most successful late in fall or early in spring.

The hazard of erosion and the depth of the root zone are the primary limitations to dryfarming. Erosion can be controlled by stubble mulching and minimum tillage. Terraces and diversions and other structures for controlling erosion are effective on long slopes that have a uniform grade. The bedrock hampers the growth of most deep-rooted crops.

The use of this soil for residential development is limited by the depth to rock, low strength, and shrink-swell potential.

The depth to bedrock limits this soil for use as septic tank absorption fields. This limitation can be offset by increasing the size of the absorption field or by using a mound-type absorption field.

The shrink-swell potential and low strength are limitations to the use of this soil as sites for houses without basements. The depth to rock is an additional limitation to the construction of houses with basements. Suitable backfill can minimize the stress on basement walls that is caused by the shrinking and swelling of the soil.

Roads and streets need to be designed to offset the shrink-swell potential and the low strength of this soil.

This map unit is in capability subclass IVe, nonirrigated.

64-Gem-Rock outcrop complex, 5 to 40 percent slopes. This complex is on basalt plains and in areas where basalt outcrops on the Boise Front. The elevation is 2,900 to 4,200 feet. The average annual precipitation is 14 inches, the average annual temperature is about 50 degrees F, and the frost-free period is about 140 days.

About 75 percent of the complex is Gem gravelly clay loam, and about 15 percent is Rock outcrop. The rest is Brent loam, 8 to 30 percent slopes; Day clay, 5 to 30 percent slopes; and Gem silty clay loam, 2 to 15 percent slopes.

The Gem soil is moderately deep and well drained. It formed mainly in material that weathered from basalt, tuff, and volcanic ash and that is covered by loess in some areas. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is dark brown gravelly clay loam. Stones cover about 5 percent of the surface. The subsoil is dark grayish brown, brown, and pale brown clay loam and clay about 11 inches thick. The substratum is very pale brown gravelly loam about 5 inches thick. It is underlain by highly fractured, weathered basalt. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability is slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium to very rapid, and the hazard of erosion is moderate to high.

The Rock outcrop is exposed basalt. In areas of this complex the outcrops are eroded and they vary in size and height.

Areas of this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on the Gem soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Sagebrush increases.

The soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

This complex is in capability subclass VIe, nonirrigated.

65-Goose Creek loam. This soil is very deep and somewhat poorly drained. It formed in alluvium that derived from dominantly acid igneous material. It is on low alluvial terraces. The slope ranges from 0 to 2 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is dark gray loam and clay loam about 20 inches thick. The underlying material is dark gray, gray, and grayish brown heavy loam, clay loam, and loam to a depth of 60 inches or more.

Included in mapping are small areas of Beetville fine sandy loam, Bram silt loam, Drax loam, Falk fine sandy loam, Moulton fine sandy loam, and a soil that is similar to this Goose Creek soil but contains gravel above a depth of 40 inches. These included soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight. These soils may flood if the amount of runoff received from higher lying areas is abnormally great.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used for residential and urban development.

The water table, which is at a depth of 2.5 to 3.5 feet during the peak of irrigation season, is the main limitation to agriculture. It restricts the growth of some deep-rooted crops. This limitation should be considered in crop selection and irrigation water management. Drainage can be improved by installing buried tile drains if a suitable outlet is available.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the intake rate, accelerated erosion will occur.

The use of this soil for residential development is limited by wetness, hazard of flooding, slow permeability, shrink-swell potential, low strength, and hazard of frost action.

The wetness and the slow permeability limit this soil for use as septic tank absorption fields. These limitations can be overcome by increasing the size of the absorption field and by using mound-type absorption fields. If effluent is discharged into the water table, contamination of nearby water supplies is a hazard.

The hazard of flooding and the seasonal high water table are limitations to the use of this soil as sites for houses.

This map unit is in capability subclass IIw, irrigated.

66-Harpt loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in alluvium that derived from acid igneous material. It is on alluvial fans and low alluvial terraces. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and dark grayish brown loam, fine sandy loam, and silt loam about

22 inches thick. The subsoil is brown silt loam about 14 inches thick. The substratum is pale brown and light brownish gray fine sandy loam and coarse sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Cashmere coarse sandy loam, 0 to 4 percent slopes; Drax loam; Jenness fine sandy loam, 0 to 2 percent slopes; and Tindahay fine sandy loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

There are few limitations to agriculture, and in most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by low strength and a hazard of frost action. In general, however, this soil is well suited to use as sites for houses with and without basements.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability class I, irrigated, and subclass VIc, nonirrigated.

67-Harpt loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in alluvium that derived from acid igneous material. It is on alluvial fans and low alluvial terraces. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown and dark grayish brown loam, fine sandy loam, and silt loam about

22 inches thick. The subsoil is brown silt loam about 14 inches thick. The substratum is pale brown and light brownish gray fine sandy loam and coarse sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Cashmere coarse sandy loam, 2 to 4 percent slopes; Drax loam; Jenness fine sandy loam, 0 to 2 percent slopes; and Tindahay fine sandy loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

There are few limitations to agriculture, and in most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by low strength and a hazard of frost action. In general, however, this soil is well suited to use as sites for houses with and without basements.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

68-Haw-Lankbush complex, 4 to 15 percent slopes. The soils in this complex are on alluvial terraces and alluvial fans of the Boise Front. The elevation is 2,700 to 3,600 feet. The average annual precipitation is 11 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 60 percent of the complex is Haw loam, and 20 percent is Lankbush sandy loam. The rest is Brent loam, 8 to 12 percent slopes; Cashmere coarse sandy loam, 4

to 12 percent slopes; Quincy fine gravelly loamy coarse sand, 4 to 12 percent slopes; and a soil that is similar to Haw loam, 4 to 15 percent slopes, but is underlain by sandstone.

The Haw soil is very deep and well drained. It formed mainly in alluvium that derived from acid igneous material. Typically, the surface layer is brown loam about 14 inches thick. The subsoil is yellowish brown and light yellowish brown clay loam about 16 inches thick. The substratum in the upper 8 inches is light gray loam; below that, to a depth of 60 inches or more, it is white loamy sand.

Permeability of the Haw soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The Lankbush soil is very deep and well drained. It formed mainly in alluvium from acid igneous material or lacustrine deposits. This soil is covered by loess. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of these soils for residential development is limited by the slope, moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The slope and moderately slow permeability limit these soils for use as septic tank absorption fields. These limitations can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. If effluent is discharged into the substratum, contamination of nearby water supplies is a hazard.

The use of these soils as sites for houses with and without basements is limited by the slope and shrink-swell potential. Suitable backfill can minimize the stress on basement walls that is caused by the shrinking and swelling of the soil.

The low strength, frost action potential, shrink-swell potential, and slope limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset the low strength, frost action, and shrink-swell potential.

This complex is in capability subclass VIe, nonirrigated.

69-Haw-Lankbush complex, 15 to 25 percent slopes. The soils in this complex are on alluvial terraces and alluvial fans of the Boise Front. The elevation is 2,700 to 3,600 feet. The average annual precipitation is 11 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 60 percent of the complex is Haw loam, and 20 percent is Lankbush sandy loam. The rest is Brent loam, 15 to 30 percent slopes; Quincy fine sandy loam, 15 to 30 percent slopes; and a soil that is similar to Haw loam but is underlain by sandstone bedrock at a depth of 20 to 60 inches.

The Haw soil is very deep and well drained. It formed mainly in acid igneous alluvium. In a typical profile of the Haw soil, the surface layer is brown loam about 14 inches thick. The subsoil is yellowish brown and light yellowish brown clay loam about 16 inches thick. The substratum in the upper 8 inches is light gray loam; below that, to a depth of 60 inches or more, it is white loamy sand.

Permeability of the Haw soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Lankbush soil is very deep and well drained. It formed mainly in alluvium from acid igneous material or lacustrine deposits. In some areas, this soil is covered by loess. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of these soils for residential development is severely limited by slope, moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The moderately slow permeability and slope limit these soils for use as septic tank absorption fields. Increasing the size of the absorption field can generally offset the moderately slow permeability. Mound-type absorption fields can be used if space is limited. If effluent is discharged into the substratum, contamination of nearby water sources is a hazard.

Digging and trenching are difficult because of the steepness of slope. Lankbush soils are also affected by unstable cutbanks. Roads, driveways, and other paved surfaces need to be designed to offset the slope.

This complex is in capability subclass VIe, nonirrigated.

70-Haw-Lankbush complex, 25 to 40 percent slopes. The soils in this complex are on alluvial terraces and alluvial fans of the Boise Front. The elevation is 2,700 to 3,600 feet. The average annual precipitation is 11 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 60 percent of the complex is Haw loam, and 20 percent is Lankbush sandy loam. The rest is Brent sandy loam, 30 to 65 percent slopes; Quincy fine sandy loam, 30 to 80 percent slopes; and a soil that is similar to Haw loam but is underlain by sandstone bedrock at a depth of 20 to 60 inches.

The Haw soil is very deep and well drained. It formed mainly in alluvium that derived from acid igneous material. Typically, the surface layer is brown loam about 14 inches thick. The subsoil is yellowish brown and light yellowish brown clay loam about 16 inches thick. The substratum in the upper 8 inches is light gray loam; below that, to a depth of 60 inches or more, it is white loamy sand.

Permeability of the Haw soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The Lankbush soil is very deep and well drained. It formed mainly in acid igneous alluvium or lacustrine deposits. In some areas, this soil is covered by loess. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass

decreases and is gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

The soils are best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

71-Jenness fine sandy loam, 0 to 2 percent slopes.

This soil is very deep and well drained. It formed in acid igneous material on alluvial fans and low alluvial terraces. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray fine sandy loam about 9 inches thick. The underlying material in the upper part consists of light brownish gray and pale brown fine sandy loam, loam, and sandy loam and is about 44 inches thick. In the lower part, to a depth of 60 inches or more, it is very pale brown silt loam.

Included in mapping are small areas of Cashmere coarse sandy loam, 0 to 4 percent slopes; Falk fine sandy loam; Feltham loamy sand, 0 to 3 percent slopes; Tindahay fine sandy loam, 0 to 2 percent slopes; and a loamy sandy soil that is underlain by bedrock at a depth of 10 to 40 inches. These included soils make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, and potatoes are also grown. In some areas, this soil is used for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

This soil is well suited to agriculture. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corru-

gation systems are well suited to alfalfa, small grains, and pasture. The furrow and sprinkler systems are well suited to row crops.

The use of this soil for residential development is limited mainly by the moderate permeability and low strength of the soil and a hazard of frost action in the soil.

This map unit is in capability class I, irrigated, and subclass VIc, nonirrigated.

72-Jenness fine sandy loam, 2 to 4 percent slopes.

This soil is very deep and well drained. It formed in acid igneous material on alluvial fans and low alluvial terraces. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray fine sandy loam about 9 inches thick. The underlying material in the upper part is light brownish gray and pale brown fine sandy loam, loam, and sandy loam about 44 inches thick. The lower part is very pale brown silt loam to a depth of 60 inches or more.

Included in mapping are small areas of Cashmere coarse sandy loam, 0 to 4 percent slopes; Falk fine sandy loam; Feltham loamy sand, 0 to 3 percent slopes; Tindahay fine sandy loam, 2 to 4 percent slopes; and a loamy sand that is underlain by bedrock at a depth of 10 to 40 inches. These included soils make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. A significant acreage is farmed.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

This soil is well suited to agriculture. Alfalfa, field corn, sweet corn, wheat, barley, potatoes, sugar beets, and pasture plants are grown. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum, and other amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The corrugation

system is well suited to alfalfa, small grains, and pasture. The furrow and sprinkler systems are well suited to row crops.

The use of this soil for residential development is limited mainly by the moderate permeability, frost action potential, and low strength.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

73-Kunaton silty clay loam, 0 to 2 percent slopes.

This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,700 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Chilcott silt loam, bedrock substratum, 0 to 2 percent slopes, and Kunaton silty clay loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The shallowness of the root zone, the low available water capacity, and the slow intake of irrigation water are

the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The fine-textured plow layer limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Restricting tillage operations to periods of favorable soil moisture levels improves tilth and aids seedling emergence and water penetration.

The use of this soil for residential development is limited by shallowness to hardpan and the underlying bedrock, shrink-swell potential, and low strength.

This soil is in capability subclass IVs, irrigated, and VIs, nonirrigated.

74-Kunaton silty clay loam, 2 to 4 percent slopes.

This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,700 to 3,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Chilcott silt loam, bedrock substratum, 2 to 4 percent slopes, and Sebree silty clay loam, bedrock substratum, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The shallowness of the root zone, low available water capacity, and slow intake of irrigation water are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The texture of the plow layer limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Restricting tillage operations to periods of favorable soil moisture levels improves tilth and aids seedling emergence and water penetration.

The use of this soil for residential development is limited by shallowness to hardpan and the underlying bedrock, shrink-swell potential, and low strength.

This soil is in capability subclass IVe, irrigated, and VIs, nonirrigated.

75-Kunaton-Rubble land complex, 2 to 8 percent slopes.

The soil and the Rubble land in this complex are on dissected basalt plains. The elevation is 3,000 to 3,900 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

About 50 percent of the complex is Kunaton silty clay loam, and 30 percent is Rubble land. The rest is McCain extremely stony silt loam, 2 to 8 percent slopes; Peasley silty clay loam, 2 to 6 percent slopes; and Rock outcrop that is level to extremely steep.

The Kunaton soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

The Rubble land consists of areas of stones and boulders, which are free of vegetation except for some lichens. Some of these areas are on the side slopes of narrow drainageways and are linear.

Areas of this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suit-

able grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall, the low available water capacity limits plant growth.

This complex is in capability subclass VIe, nonirrigated.

76-Kunaton-Sebree silty clay loams, 0 to 2 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 65 percent of the complex is Kunaton silty clay loam, and 20 percent is Sebree silty clay loam. The rest is Bowns stony loam, 0 to 8 percent slopes; Chardoton stony silty clay loam, 0 to 2 percent slopes; Chilcott silt loam, bedrock substratum, 0 to 2 percent slopes; Rock outcrop; and Trevino stony silt loam, 5 to 20 percent slopes.

The Kunaton soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Kunaton soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas of this soil are small and subrounded. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and a white hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded or very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, these soils are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Kunaton soil is dominated by bluebunch wheatgrass, Thurber

needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Kunaton soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of slick spots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excessive sodium.

The shallowness of the root zone and slow permeability are the major limitations to agriculture on these soils. Low available water capacity is an additional limitation to this use on the Kunaton soil. The hardpan hinders the growth of some deep-rooted crops and limits the available water capacity. The moderately fine texture of the plow layer limits the growth of potatoes, sugar beets, and other root crops. The sodic condition of the Sebree soil can limit the growth of most crops.

The use of these soils for residential development is limited mainly by depth to the hardpan and the underlying bedrock, shrink-swell potential, low strength, and frost action potential.

This complex is in capability subclass IVs, irrigated, and VIIs, nonirrigated.

77-Kunaton-Sebree silty clay loams, 2 to 4 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 65 percent of the complex is Kunaton silty clay loam, and 20 percent is Sebree silty clay loam. The rest is Bowns stony loam, 0 to 8 percent slopes; Chardoton stony silty clay loam, 2 to 4 percent slopes; Chilcott silt loam, bedrock substratum, 2 to 4 percent slopes; Rock outcrop; and Trevino stony silt loam, 5 to 20 percent slopes.

The Kunaton soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Kunaton soil is slow above the hardpan and very slow through fractures in the hardpan.

The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas of this soil are small and subrounded. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and a white, strongly cemented hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Kunaton soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Kunaton soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of slick spots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excessive sodium.

The hazard of erosion, depth of the root zone, and slow permeability are the major limitations to agriculture. Low available water capacity is an additional limitation to this use on the Kunaton soil. The hardpan hinders the growth of some deep-rooted crops and limits the available water capacity of these soils. The texture of the plow layer limits the growth of potatoes, sugar beets, and other root crops. The sodic condition of the Sebree soil can limit the growth of most crops.

The use of these soils for residential development is limited mainly by the depth to the hardpan and the underlying bedrock, shrink-swell potential, low strength, and frost action potential.

This complex is in capability subclass IVe, irrigated, and VIs, nonirrigated.

78-Kunaton-Sebree silty clay loams, 4 to 8 percent slopes. The soils in this complex are on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 65 percent of the complex is Kunaton silty clay loam, and 20 percent is Sebree silty clay loam. The rest is Bowns stony loam, 0 to 8 percent slopes; Chilcott silt loam, bedrock substratum, 4 to 8 percent slopes; Rock outcrop; and Trevino stony silt loam, 5 to 20 percent slopes.

The Kunaton soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silty clay loam about 4 inches thick. The subsoil is brown and very pale brown silty clay about 9 inches thick. The substratum is a very pale brown hardpan about 12 inches thick. Fractured basalt underlies the hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Kunaton soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by basalt. Areas of this soil are small and subrounded. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is brown and light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick and a white hardpan about 8 inches thick. Basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Kunaton soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Kunaton soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be

reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush, black greasewood, and sparse bluebunch wheatgrass along the margins of slick spots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excess sodium.

The hazard of erosion, depth of the root zone, and slow permeability are the major limitations to agriculture on these soils. Low available water capacity is an additional limitation to this use on the Kunaton soil. The hardpan hinders the growth of some deep-rooted crops. It also affects the available water capacity of these soils. The texture of the plow layer limits the growth of potatoes, sugar beets, and other root crops. The sodic condition of the Sebree soil can limit the growth of most crops.

The use of these soils for residential development is limited mainly by depth to the hardpan and underlying bedrock, shrink-swell potential, low strength, and frost action potential.

This complex is in capability subclass IVe, irrigated, and VIe, nonirrigated.

79-Ladd loam, 4 to 15 percent slopes. This soil is very deep and well drained. It formed in highly weathered granitic colluvium on colluvial mountain foot slopes. The elevation is 2,900 to 3,800 feet. The average annual precipitation is 16 inches. The average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of about 72 inches.

Included in mapping are small areas of Ada gravelly sandy loam, 4 to 15 percent slopes, and Brent loam, 8 to 12 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for dryland wheat or for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can

be reseeded to pubescent wheatgrass, intermediate wheatgrass, or other suitable plants. Seedings are most successful late in fall or early in spring.

The use of this soil for residential development and most other engineering purposes is limited primarily by slope and inaccessibility. Subsoil permeability and shrink-swell potential also are limitations to this use.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IIIe, nonirrigated.

80-Ladd loam, 15 to 30 percent slopes. This soil is very deep and well drained. It formed in highly weathered granitic colluvium on mountain foot slopes. The elevation is 2,900 to 3,800 feet. The average annual precipitation is 16 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Included in mapping are small areas of Ada gravelly sandy loam, 15 to 30 percent slopes, and Brent loam, 15 to 30 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for dryland wheat or for residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedings are most successful late in fall or early in spring.

The use of this soil for residential development and most other engineering purposes is severely limited by slope and inaccessibility. The permeability and the shrink-swell potential of the subsoil and the hazard of seepage in the substratum also are limitations to this use.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to

accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This map unit is in capability subclass IVe, nonirrigated.

81-Ladd loam, 30 to 65 percent slopes. This soil is very deep and well drained. It formed in highly weathered granitic colluvium on colluvial mountain foot slopes. The elevation is 2,900 to 3,800 feet. The average annual precipitation is 16 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 14 days.

Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Included in mapping are small areas of Ada gravelly sandy loam, 30 to 60 percent slopes, and Brent loam, 30 to 65 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

In most areas, this soil is used as rangeland and wildlife habitat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This map unit is in capability subclass VIe, nonirrigated.

82-Ladd-Ada complex, 15 to 30 percent slopes. The soils in this complex are on colluvial mountain foot slopes and alluvial terraces. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 55 percent of the complex is Ladd loam, and 30 percent is Ada gravelly sandy loam. The rest is Brent loam, 12 to 30 percent slopes; Lankbush sandy loam, 15 to 30 percent slopes; and Tenmile very gravelly loam, 12 to 30 percent slopes.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31

inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is high or very high.

The Ada soil is very deep and well drained. It formed in coarse granitic alluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum consists of light brown very gravelly loamy coarse sand and variegated sand and gravel to a depth of 60 inches or more.

Permeability of the Ada soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for dryland wheat or for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing late in spring, early in summer, and in fall. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, or other suitable plants. Seedings are most successful late in fall or early in spring.

The hazard of erosion and limited moisture are the major limitations to dryland farming on these soils. Erosion can be controlled by stubble mulching and minimum tillage. On long slopes that have a uniform grade, erosion can be controlled by terraces, diversions, and other structures.

The use of these soils for residential development and most other engineering purposes is severely limited by slope and inaccessibility. A slowly permeable subsoil, excessive clay, and shrink-swell potential also are limitations.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass IVe, nonirrigated.

83-Ladd-Ada complex, 30 to 60 percent slopes. The soils in this complex are on colluvial mountain footslopes and alluvial terraces. The elevation is 2,700 to 3,800 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 55 percent of the complex is Ladd loam, and 30 percent is Ada gravelly sandy loam. The rest is Lankbush sandy loam, 30 to 60 percent slopes; Brent loam, 30 to 65 percent slopes; and Tenmile very gravelly loam, 30 to 65 percent slopes.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is high or very high.

The Ada soil is very deep and well drained. It formed in coarse granitic alluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum consists of light brown very gravelly loamy coarse sand and variegated sand and gravel to a depth of 60 inches or more.

Permeability of the Ada soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

84-Ladd-Haw loams, 30 to 60 percent slopes. The soils in this complex are on colluvial mountain foot slopes and alluvial terraces. The elevation is 2,900 to 3,200 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 45 percent of the complex is Ladd loam, and 25 percent is Haw loam. The rest is Ada gravelly sandy loam, 30 to 60 percent slopes; Brent sandy loam, 30 to 65 percent slopes; and Lankbush sandy loam, 30 to 65 percent slopes.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The Haw soil is very deep and well drained. It formed mainly in acid igneous alluvium. Typically, the surface layer is brown loam about 14 inches thick. The subsoil is yellowish brown and light yellowish brown clay loam about 16 inches thick. The substratum in the upper 8 inches is light gray loam; below that, to a depth of 60 inches or more, it is white loamy sand.

Permeability of the Haw soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

85-Ladd-Searles complex, 4 to 15 percent slopes.

The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,400 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 49 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Ladd loam, and 25 percent is Searles gravelly loam. The rest is Brent loam, 4 to 15 percent slopes; Rock outcrop; and a soil that is similar to Brent loam, 4 to 15 percent slopes, but has a dark colored surface layer that is more than 20 inches thick.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from granitic rock. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Pale brown weathered gran-

ite underlies the subsoil. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for dryland wheat or for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, or other annuals. Big sagebrush increases.

These soils are best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The hazard of erosion and limited moisture are the major limitations to dryland farming on these soils. Erosion can be controlled by stubble mulching and minimum tillage. On long slopes that have a uniform grade, erosion can be controlled by terraces, diversions, and other structures.

Inaccessibility is the primary limitation to the use of these soils as sites for residential development. Moderately slow permeability, frost action potential, low strength, and slope are additional limitations to this use on the Ladd soil. Depth to bedrock, frost action potential, and slope are additional limitations to this use on the Searles soil.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass IVe, nonirrigated.

86-Ladd-Searies complex, 15 to 30 percent slopes.

The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,400 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 49 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Ladd loam, and 30 percent is Searles gravelly loam. The rest is Rainey coarse sandy loam, 15 to 30 percent slopes, and Rock outcrop.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The

subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid, and the hazard of erosion is high.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from granitic rock. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Pale brown weathered granite underlies the subsoil. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush, forbs, and Sandberg bluegrass increase.

These soils are best suited to grazing late in spring, early in summer, and in fall. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The use of these soils for residential development and most other engineering purposes is limited primarily by the slope and inaccessibility. The moderately slow permeability also is a limitation. Depth to rock is an additional limitation to these uses on the Searles soil.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIe, nonirrigated.

87-Ladd-Searies complex, 30 to 65 percent slopes.

The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,300 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 49 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Ladd loam, and 30 percent is Searles gravelly loam. The rest is Rainey

coarse sandy loam, 30 to 65 percent slopes; Rock outcrop; and Van Dusen loam, 30 to 65 percent slopes.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from granitic rock. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is pale brown gravelly coarse sandy clay loam about 16 inches thick. Pale brown weathered granite underlies the subsoil. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is mainly bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush, forbs, and Sandberg bluegrass increase.

These soils are best suited to grazing late in spring, early in summer, and in fall. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

88-Ladd-Van Dusen loams, 30 to 60 percent slopes. The soils in this complex are on alluvial and lacustrine terraces and on colluvial mountain foot slopes. The elevation is 2,900 to 3,700 feet. The average annual precipitation is 14 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Ladd loam, 30 to 60 percent slopes, and 25 percent is Van Dusen loam, 40 to 60 percent slopes. The rest is Brent loam or sandy loam, 30 to 65 percent slopes, and Haw loam, 30 to 60 percent slopes.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface

layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The Van Dusen soil is very deep and well drained. It formed in acid igneous alluvium. Typically, the surface layer is dark grayish brown loam about 14 inches thick. The subsoil is grayish brown, brown, and pale brown gravelly loam and coarse sandy clay loam about 30 inches thick. The substratum is pale brown loamy coarse sand to a depth of 60 inches or more.

Permeability of the Van Dusen soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on these soils is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing late in spring, early in summer, and in fall. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

89-Lankbush-Brent sandy loams, 4 to 12 percent slopes. The soils in this complex are on alluvial fans and alluvial terraces of the Boise Front. The elevation is 2,800 to 3,400 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Lankbush sandy loam, and 30 percent is Brent sandy loam, low rainfall. The rest is Brent loam, low rainfall, 4 to 8 percent slopes; Ladd loam, 4 to 15 percent slopes; Quincy fine gravelly loamy coarse sand, 8 to 12 percent slopes; Tenmile very gravelly loam, 4 to 15 percent slopes; and Tindahay fine sandy loam, 4 to 8 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in acid igneous alluvial or lacustrine deposits. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Brent soil is very deep and well drained. It formed in acid igneous alluvium. Typically, the surface layer in

the upper 5 inches is grayish brown sandy loam; and below that, it is grayish brown and light brownish gray silt loam and loam about 13 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; and below that, to a depth of 60 inches or more, it is pink very gravelly loamy coarse sand.

Permeability of the Brent soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used primarily as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of these soils for residential development is limited by permeability, low strength, shrink-swell potential, and frost action potential.

The very slow permeability of the subsoil limits these soils for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. If effluent is discharged into the substratum, contamination of nearby water supplies is a hazard.

The low strength of the subsoil limits the Brent soil for use as sites for houses. The shrink-swell potential of the subsoil limits the Brent and Lankbush soils for use as sites for houses with basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can offset these limitations.

This complex is in capability subclass VIe, nonirrigated.

90-Lankbush-Brent sandy loams, 12 to 30 percent slopes. The soils in this complex are on alluvial fans and alluvial terraces of the Boise Front. The elevation is 2,800 to 3,400 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Lankbush sandy loam, and 30 percent is Brent sandy loam, low rainfall. The rest is Brent loam, low rainfall, 15 to 30 percent

slopes; Quincy fine gravelly loamy coarse sand, 15 to 30 percent slopes; and Tenmile very gravelly loam, 12 to 30 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvium that derived from acid igneous material or in lacustrine deposits. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Brent soil is very deep and well drained. It formed in alluvium from acid igneous material. Typically, the surface layer in the upper 5 inches is grayish brown sandy loam; below that, it is grayish brown and light brownish gray silt loam and loam about 13 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; and below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used primarily as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of these soils for residential development is limited by slope, shrink-swell potential, and low strength.

Permeability and slope limit these soils for use as septic tank absorption fields.

Digging and trenching are difficult mainly because of the steepness of slope.

The steepness of slope is a limitation to the use of these soils as sites for houses with and without basements. Shrink-swell potential is a limitation to the use of the Brent soil as sites for houses with basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength and slope limit the construction of roads, driveways, and other paved surfaces. Shrink-swell

potential is an additional limitation to construction on the Brent soil. Suitable subgrade material can offset the low strength and the shrink-swell potential.

This complex is in capability subclass VIe, nonirrigated.

91-Lankbush-Brent sandy loams, 30 to 65 percent slopes. The soils in this complex are on alluvial fans and alluvial terraces of the Boise Front. The elevation is 3,000 to 4,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Lankbush sandy loam, and 30 percent is Brent sandy loam, low rainfall. The rest is Quincy fine gravelly loamy coarse sand, 30 to 65 percent slopes, and Tenmile very gravelly loam, 30 to 65 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvium that derived from acid igneous material or in lacustrine deposits. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The Brent soil is very deep and well drained. It formed in alluvium from acid igneous material. Typically, the surface layer in the upper 5 inches is grayish brown sandy loam; below that, it is grayish brown and light brownish gray silt loam and loam about 13 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly clay loam and very gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used primarily as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIle, nonirrigated.

92-Lankbush-Chardoton complex, 0 to 2 percent slopes. The soils in this complex are on low alluvial

terraces. The slope ranges from 0 to 2 percent. The elevation is 3,100 to 3,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 55 percent of the complex is Lankbush sandy loam, and 30 percent is Chardoton silty clay loam. The rest is Kiesel Variant silty clay loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; and Tindahay fine sandy loam, 0 to 2 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvial or lacustrine sediment that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Chardoton soil is very deep and well drained. It formed mainly in loess over silty alluvium. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silty clay loam. The subsoil is brown, light yellowish brown, and pale brown silty clay and clay loam about 21 inches thick. The substratum in the upper 37 inches is pale brown, light yellowish brown, and very pale brown loam and fine sandy loam. Below that, to a depth of 60 inches or more, it is pale brown silty clay.

Permeability of the Chardoton soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

The soils in this complex are used primarily as rangeland and wildlife habitat. In some areas, they are used for irrigated and dryland crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Limited moisture is the primary limitation to dryland farming on these soils. The fine-textured subsoil is the major limitation to irrigated farming. In some areas of the Chardoton soil, salinity is a limitation to this use. Apply-

ing gypsum and other soil amendments improves the structure of the soil thus aiding seedling emergence and water penetration.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of these soils for residential development is limited by permeability, shrink-swell potential, low strength, and frost action potential.

The moderately slow or slow permeability is a limitation to the use of these soils as septic tank absorption fields. This limitation can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

Shrink-swell potential is a limitation to the use of these soils as sites for houses with basements. Low strength is an additional limitation to this use on the Chardoton soil. The low strength can affect foundations and other structures that support loads. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling. Low strength is a limitation to the use of the Chardoton soil as sites for houses without basements. The Lankbush soil is well suited to this use.

The low strength and the hazard of frost action limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

93-Lankbush-Ladd complex, 15 to 30 percent slopes. The soils in this complex are on alluvial terraces and colluvial mountain foot slopes. The elevation is 2,900 to 3,700 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Lankbush sandy loam, 15 to 25 percent slopes, and 35 percent is Ladd loam, 20 to 30 percent slopes. The rest is Brent loam, 15 to 30 percent slopes; Day clay, 15 to 30 percent slopes; Gem gravelly clay loam, 5 to 40 percent slopes; Haw loam, 15 to 30 percent slopes; Payette sandy loam, 15 to 30 percent slopes; and Searles fine gravelly loam, 15 to 30 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvial or lacustrine deposits that derived from acid igneous material. The Lankbush soil is on short, southerly exposures in an area of complex dendritic drainage patterns. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more.

The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic alluvium and colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings should be made late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Ladd soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Sagebrush increases.

This Ladd soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, and alfalfa. Seedlings should be made late in fall or early in spring.

The use of these soils for residential development and most other engineering purposes is limited primarily by slope and inaccessibility. The moderately slow permeability of the subsoil and high shrink-swell potential also are limitations to this use.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other runoff measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIe, nonirrigated.

94-Lankbush-Ladd complex, 30 to 60 percent slopes. The soils in this complex are on alluvial terraces and colluvial mountain foot slopes. The elevation is

2,900 to 3,700 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 40 percent of the complex is Lankbush sandy loam, 30 to 50 percent slopes, and 35 percent is Ladd loam, 40 to 60 percent slopes. The rest is Brent loam, 30 to 65 percent slopes; Haw loam, 30 to 60 percent slopes; Payette sandy loam, 30 to 65 percent slopes; and Searles fine gravelly loam, 15 to 30 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvial or lacustrine deposits that derived from acid igneous material. The Lankbush soil is on short, southerly exposures in an area of complex dendritic drainage patterns. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability of the Ladd soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The natural vegetation on the Lankbush soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

The potential natural plant community on the Ladd soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, and other annuals. Big sagebrush increases.

This Ladd soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

95-Lankbush-Tenmile complex, 0 to 4 percent slopes. The soils in this complex are on alluvial terraces

and dissected alluvial plains. The elevation is 3,400 to 4,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Lankbush sandy loam, and 20 percent is Tenmile very gravelly loam. The rest is Chardoton stony silty clay loam, 0 to 4 percent slopes.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Lankbush soil is very deep and well drained. It formed in alluvial or lacustrine deposits that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of this Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very slow or slow, and the hazard of erosion is slight.

The Tenmile soil is very deep and well drained. It formed in coarse, granitic alluvium. Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; and below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Permeability of this Tenmile soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Tenmile soil is dominated by bluebunch wheatgrass, Thurber

needlegrass, and Antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Antelope bitterbrush increases.

This Tenmile soil is best suited to grazing early in spring and in fall. Range seeding is limited by droughtiness and by the difficulty of preparing a seedbed in the very gravelly topsoil.

Limited moisture and small stones are the major limitations to agriculture. These limitations affect crop selection and tillage.

The use of these soils for residential development is limited by the moderately slow or slow permeability, low strength, frost action potential, shrink-swell potential, and inaccessibility.

The moderately slow or slow permeability is a limitation to the use of these soils as septic tank absorption fields. This limitation can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential is a limitation to the use of these soils for use as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The shrink-swell potential limits the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset this limitation.

This complex is in capability subclass III_s, irrigated, and VI_c, nonirrigated.

96-Lankbush-Tenmile complex, 4 to 12 percent slopes. The soils in this complex are on alluvial terraces and dissected alluvial plains. The elevation is 3,400 to 4,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 55 percent of the complex is Lankbush sandy loam, and 25 percent is Tenmile very gravelly loam. The rest is a soil that is similar to Tenmile very gravelly loam, 4 to 12 percent slopes, but is severely eroded.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

The Lankbush soil is very deep and well drained. It formed in alluvial or lacustrine deposits that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of this Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Tenmile soil is very deep and well drained. It formed in coarse, granitic alluvium. Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; and below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Permeability of this Tenmile soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Tenmile soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and Antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Antelope bitterbrush increases.

This soil is best suited to grazing early in spring and in fall. Range seeding is limited by droughtiness and by the difficulty of preparing a seedbed in the very gravelly topsoil.

The use of these soils as sites for residential development is limited by the moderately slow or slow permeability, low strength, frost action potential, shrink-swell potential, and slope.

The use of these soils as septic tank absorption fields is limited mainly by permeability. This limitation can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential is a limitation to the use of these soils as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The shrink-swell potential and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This complex is in capability subclass VI_e, nonirrigated.

97-Lankbush-Tenmile complex, 12 to 20 percent slopes. The soils in this complex are on alluvial terraces and dissected alluvial plains. The elevation is 3,400 to 4,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Lankbush sandy loam, and 35 percent is Tenmile very gravelly loam. The rest is a soil that is similar to Tenmile very gravelly loam, 12 to 20 percent slopes, but is severely eroded.

The Lankbush soil is very deep and well drained. It formed in alluvial or lacustrine deposits that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of this Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Tenmile soil is very deep and well drained. It formed in coarse, granitic alluvium. Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; and below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Permeability of this Tenmile soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Tenmile soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and Antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This Tenmile soil is best suited to grazing early in spring and in fall. Range seeding is limited by droughti-

ness and by the difficulty of preparing a seedbed in the very gravelly topsoil.

The use of these soils for residential development is limited by the slow permeability, shrink-swell potential, and slope.

The use of these soils as septic tank absorption fields is limited mainly by the moderately slow or slow permeability and slope. The permeability can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The slope and the shrink-swell potential are limitations to the use of these soils as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The shrink-swell potential and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This complex is in capability subclass VIe, nonirrigated.

98-Lankbush-Tenmile complex, 35 to 65 percent slopes. The soils in this complex are on alluvial terraces and dissected alluvial plains. The elevation is 3,400 to 4,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 50 percent of the complex is Lankbush sandy loam, and 35 percent is Tenmile very gravelly loam. The rest is a soil that is similar to Tenmile very gravelly loam, 12 to 20 percent slopes, but is severely eroded.

The Lankbush soil is very deep and well drained. It formed in alluvial or lacustrine deposits from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of this Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The Tenmile soil is very deep and well drained. It formed in coarse, granitic alluvium. Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Permeability of this Tenmile soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used as rangeland and wildlife habitat.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This Lankbush soil is best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

The potential natural plant community on the Tenmile soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and Antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This Tenmile soil is best suited to grazing early in spring and in fall. Range seeding is limited by droughtiness and the difficulty of preparing a seedbed in the very gravelly topsoil.

This complex is in capability subclass VIle, nonirrigated.

99-Lankbush-Tindahay sandy loams, 0 to 2 percent slopes. The soils in this complex are on alluvial terraces, alluvial fans, and low alluvial terraces adjacent to intermittent drainageways. The elevation is 3,100 to 3,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

About 50 percent of the complex is Lankbush sandy loam, and 40 percent is Tindahay sandy loam. The rest is Chardoton silty clay loam, 0 to 2 percent slopes; Jenness fine sandy loam, 0 to 2 percent slopes; and Quincy sand, 2 to 8 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvial or lacustrine deposits that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The Tindahay soil is very deep and somewhat excessively drained. It formed mainly in alluvium of acid igneous origin. Typically, the surface layer is light brownish gray sandy loam about 8 inches thick. The underlying material in the upper 15 inches is light brownish gray and pale brown fine sandy loam and sandy loam. Below that, to a depth of 60 inches or more, it is light gray loamy coarse sand and variegated fine gravelly loamy coarse sand.

Permeability of the Tindahay soil is moderately rapid. The root zone extends to a depth of 60 inches or more.

The available water capacity is moderate. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Use of the Lankbush soil as sites for residential development is limited primarily by the moderately slow permeability, shrink-swell potential, low strength, and frost action potential. The Tindahay soil is limited for this use mainly by frost action potential.

Use of the Lankbush soil as septic tank absorption fields is limited by the moderately slow permeability. This limitation can be overcome by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The soils in this complex are well suited to use as sites for houses without basements. Use of the Lankbush soil as sites for houses with basements is limited by the shrink-swell potential. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

Low strength and frost action potential limit the construction of roads, driveways and other paved surfaces. Suitable subgrade material can help offset these limitations.

This complex is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

100-Lankbush-Tindahay sandy loams, 2 to 4 percent slopes. The soils in this complex are on alluvial terraces, alluvial fans, and low alluvial terraces adjacent to intermittent drainageways. The elevation is 3,100 to 3,200 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

About 50 percent of the complex is Lankbush sandy loam, and 40 percent is Tindahay sandy loam. The rest is Chardoton silty clay loam, 2 to 4 percent slopes; Jenness fine sandy loam, 2 to 4 percent slopes; and Quincy sand, 2 to 8 percent slopes.

The Lankbush soil is very deep and well drained. It formed mainly in alluvial or lacustrine deposits from acid igneous material. Typically, the surface layer is brown

and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Tindahay soil is very deep and somewhat excessively drained. It formed mainly in alluvium of acid igneous origin. Typically, the surface layer is light brownish gray sandy loam about 8 inches thick. The underlying material in the upper 15 inches is light brownish gray and pale brown fine sandy loam and sandy loam. Below that, to a depth of 60 inches or more, it is light gray loamy coarse sand and variegated fine gravelly loamy coarse sand.

Permeability of the Tindahay soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. They are highly erodible if the vegetation is removed; therefore, grazing management is essential to protect the soil. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Slope and, in the Tindahay soil, droughtiness are the major limitations to the use of these soils for farming. Proper crop selection and irrigation water management are needed to overcome these limitations.

Use of the Lankbush soil as sites for residential development is limited primarily by the moderately slow permeability, shrink-swell potential, low strength, and frost action potential. The Tindahay soil is limited for this use mainly by frost action potential.

Use of the Lankbush soil as septic tank absorption fields is limited by the moderately slow permeability. This limitation can be overcome by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The soils in this complex are well suited to use as sites for houses without basements. Use of the Lank-

bush soil as sites for houses with basements is limited by the shrink-swell potential. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

Low strength and frost action potential limit the construction of roads, driveways and other paved surfaces. Suitable subgrade material can help offset these limitations.

This complex is in capability subclass IIIe, irrigated, and VIc, nonirrigated.

101-McCain silt loam, 0 to 2 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, bedrock substratum, 0 to 2 percent slopes; Colthorp silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; Kunaton silty clay loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; Sebree silty clay loam, 0 to 2 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The bedrock hinders the growth of deep-rooted crops. Proper crop selection and irrigation water management are needed to overcome these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, shrink-swell potential, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. If effluent reaches the basalt, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the bedrock.

The depth to rock and low strength limit this soil for use as sites for houses without basements. The depth to rock is a limitation for houses with basements. The low strength can affect foundations or other structures that support loads.

The depth to rock, shrink-swell potential, and low strength limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset the low strength and the shrink-swell potential.

This map unit is in capability subclass II_s, irrigated, and VI_c, nonirrigated.

102-McCain silt loam, 2 to 4 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, bedrock substratum, 2 to 4 percent slopes; Colthorp silt loam, 2 to 4 percent slopes; Elijah silt loam, 2 to 4 percent slopes; Kunaton silty clay loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; Sebree silty clay loam, 2 to 4 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Depth to rock and the hazard of erosion are the major limitations to agriculture. The bedrock hinders the growth of deep-rooted crops. Proper crop selection and irrigation water management are needed to overcome these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, shrink-swell potential, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. If effluent reaches the basalt, there is a hazard of contaminating nearby water supplies.

Digging and trenching are hampered by the bedrock.

The depth to rock and low strength limit this soil for use as sites for houses without basements. The depth to rock is a limitation for houses with basements. The low strength can affect foundations or other structures that support loads.

The depth to rock, shrink-swell potential, and low strength limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset the low strength and the shrink-swell potential.

This map unit is in capability subclass II_e, irrigated, and VI_c, nonirrigated.

103-McCain silt loam, 4 to 8 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, bedrock substratum, 4 to 8 percent slopes; Elijah

silt loam, 4 to 8 percent slopes; Kunaton silty clay loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; Sebree silty clay loam, 4 to 8 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Depth to rock and the hazard of erosion are the major limitations to agriculture. The bedrock hinders the growth of deep-rooted crops. Proper crop selection and irrigation water management are needed to overcome these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, shrink-swell potential, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. If effluent reaches the basalt, there is a hazard of contaminating nearby water supplies.

Digging and trenching are hampered by the bedrock.

The depth to rock and low strength limit this soil for use as sites for houses without basements. The depth to rock is a limitation for houses with basements. The low strength can affect foundations or other structures that support loads.

The depth to rock, shrink-swell potential, and low strength limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset the low strength and the shrink-swell potential.

This map unit is in capability subclass Ille, irrigated, and Vle, nonirrigated.

104-McCain silt loam, 8 to 12 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Power silt loam, 8 to 12 percent slopes, and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone and the hazard of erosion are the major limitations to agriculture. The bedrock hinders the growth of deep-rooted crops. Proper crop selection and irrigation water management are needed to overcome these limitations. Sprinkler irrigation is best suited to the deep-rooted crops.

The use of this soil for residential development is limited by the slope, depth to rock, moderately slow permeability, shrink-swell potential, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. One alternative is the use of a closed sewer system. If effluent reaches the basalt, there is a hazard of contaminating nearby water supplies, particularly in high density residential areas.

Digging and trenching are hampered by the bedrock.

The slope and depth to rock limit this soil for use as sites for houses without basements. The depth to rock is a limitation for houses with basements.

The depth to rock, shrink-swell potential, and low strength limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

105-McCain extremely stony silt loam, 0 to 2 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown extremely stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, 0 to 2 percent slopes; Colthorp silt loam, 0 to 2 percent slopes; Kunaton silty clay loam, 0 to 2 percent slopes; Sebree silty clay loam, 0 to 2 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, large stones, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. If effluent reaches the basalt, there is a hazard of contaminating nearby water supplies.

Digging and trenching are hampered by the bedrock.

The depth to rock and the large stones limit this soil for use as sites for houses without basements. The

depth to rock is a limitation for houses with basements. Low strength can affect foundations and other structures that support loads.

The depth to rock and the low strength limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass VIIc, nonirrigated.

106-McCain extremely stony silt loam, 2 to 4 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown extremely stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, 2 to 4 percent slopes; Colthorp silt loam, 2 to 4 percent slopes; Kunaton silty clay loam, 2 to 4 percent slopes; Sebree silty clay loam, 2 to 4 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, large stones, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type absorption fields. If effluent reaches the basalt, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the bedrock and the large stones.

The construction of houses with and without basements is limited mainly by the depth to rock. Low strength can affect foundations and other structures that support loads.

The depth to rock, low strength, and large stones limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass VII, nonirrigated.

107-McCain extremely stony silt loam, 4 to 8 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown extremely stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, 4 to 8 percent slopes; Kunaton silty clay loam, 4 to 8 percent slopes; Sebree silty clay loam, 4 to 8 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be offset by the use of mound-type

absorption fields. If effluent reaches the basalt, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the bedrock.

The construction of houses with and without basements is limited mainly by the depth to rock. The low strength of this soil can affect foundations and other structures that support loads.

The depth to rock, low strength, and large stones limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass VII, nonirrigated.

108-McCain extremely stony silt loam, 8 to 12 percent slopes. This soil is moderately deep and well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown extremely stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Power silt loam, 8 to 12 percent slopes, and Trevino extremely stony silt loam, 5 to 20 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the depth to rock, moderately slow permeability, slope, and low strength.

The depth to rock and moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations can be overcome by the use of mound-type absorption fields. If effluent reaches the basalt, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the bedrock.

The construction of houses without basements is limited by the slope and the depth to rock. The construction of houses with basements is limited mainly by the depth to rock. Terracing is essential to the use of this soil as building sites. The low strength of this soil can affect foundations and other structures that support loads.

The depth to rock, low strength, and slope are limitations to the use of this soil as sites for roads and streets.

This map unit is in capability subclass VII, nonirrigated.

109-McCain-Rock outcrop complex, 0 to 15 percent slopes. This complex is on basalt plains. The elevation is 2,900 to 3,300 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is McCain extremely stony silt loam, and 20 percent is Rock outcrop. The rest is Bowns stony loam, 0 to 15 percent slopes; Chardoton stony silty clay loam, 0 to 4 percent slopes; Chilcott silt loam, 0 to 8 percent slopes; Colthorp silt loam, 0 to 4 percent slopes; Power silt loam, 0 to 12 percent slopes; and Sebree silty clay loam, 0 to 8 percent slopes.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown extremely stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow to rapid, and the hazard of erosion is slight to high.

The Rock outcrop is exposed basalt bedrock. It occurs mainly as ridges and mounds that have cracks in their crests. In some areas, it occurs as a ledge at the edge of a terrace.

Areas of this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on this McCain soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The McCain soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

This complex is in capability subclass VI, nonirrigated.

110-Minidoka silt loam, bedrock substratum, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,700 to 3,300 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 4 inches thick. The subsoil is light yellowish brown silt loam about 7 inches thick. The substratum consists of light gray silt loam about 13 inches thick and a white hardpan about 17 inches thick. Highly fractured basalt underlies the hardpan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Potratz silt loam, 2 to 4 percent slopes; Scism silt loam, bedrock substratum, 2 to 4 percent slopes; Rock outcrop; Trevino extremely stony silt loam, 5 to 20 percent slopes; and Trio very fine sandy loam, 2 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hazard of erosion can be offset through proper irrigation water management.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. Border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the rate of intake, accelerated erosion will occur.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The use of this soil for residential development is limited by a hazard of frost action, the depth to hardpan and the underlying bedrock, the moderately slow permeability, and low strength.

The depth to the hardpan and the underlying bedrock and the moderately slow permeability limit this soil for use as septic tank absorption fields. These limitations

can be offset by increasing the size of the absorption field. If effluent reaches the fractured basalt, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan and the bedrock.

The construction of houses with and without basements is limited by the depth to the hardpan and the bedrock.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

111-Moulton fine sandy loam. This soil is deep and poorly drained. It formed in acid igneous alluvium on low alluvial terraces adjacent to the Boise River flood plain. Slope ranges from 0 to 2 percent. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is grayish brown fine sandy loam about 12 inches thick. The subsoil is light brownish gray fine sandy loam about 12 inches thick. The substratum in the upper 9 inches is light brownish gray fine sandy loam; below that, to a depth of 60 inches or more, it is grayish brown very gravelly loamy sand.

Included in mapping are small areas of Baldock loam; Bissell loam, 0 to 2 percent slopes; Bram silt loam; Chance fine sandy loam; Falk fine sandy loam; Goose Creek loam; Notus soils; and Tindahay fine sandy loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is ponded to slow, and the hazard of erosion is slight. Flooding is a hazard only during periods of high runoff.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn, barley, and oats are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

Wetness is the major limitation to farming. The water table, which occurs at a depth of 1 1/2 to 3 feet, hinders the growth of some deep-rooted crops. In some areas this soil is protected from flooding by dikes and levees.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by wetness and the hazards of flooding and frost action.

Wetness limits this soil for use as septic tank absorption fields. If effluent is discharged into the water table, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by wetness. It may be necessary to use pumps at excavation sites when the water table is high.

Flooding and wetness are the major limitations to the use of this soil as sites for houses. A high water table affects houses with basements unless drainage is provided.

The hazard of frost action limits the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset this limitation.

This map unit is in capability subclass IIIw, irrigated.

112-Notus soils. This map unit consists of very deep, somewhat poorly drained soils on flood plains and low terraces along the Boise River. These soils formed in coarse, acid igneous recent alluvium. The slope ranges from 0 to 3 percent. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

This map unit consists mainly of Notus sandy loam and Notus gravelly loamy coarse sand. Included in mapping are small areas of Baldock loam; Chance fine sandy loam; Falk fine sandy loam; Moulton fine sandy loam; Tindahay fine sandy loam, 0 to 2 percent slopes; and areas of very gravelly loamy sand. These included soils make up about 15 percent of this map unit.

In a typical profile of Notus sandy loam, the surface layer is light brownish gray sandy loam about 2 inches thick. The underlying material in the upper part is pale brown loamy sand about 10 inches thick. In the lower part it is very pale brown very gravelly sand to a depth of 60 inches or more. Notus gravelly loamy coarse sand is similar except for the texture of the surface layer.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is low. Runoff is very slow, and the hazard of erosion is slight. These soils are subject to occasional flooding.

In most areas, these soils are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn and barley are also grown. In some areas, these soils are used for residential and urban development.

The moderately rapid permeability, wetness, and the hazard of flooding are the major limitations to agriculture. The permeability and a water table at a depth of 3 to 5 feet hamper the growth of deep-rooted crops and lower irrigation efficiency. In most years, flooding is likely during periods of high runoff in spring.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of these soils for residential development is limited mainly by the hazard of flooding from March through May, by wetness, and by the sandy texture.

The flood hazard and wetness limit these soils for use as septic tank absorption fields. Nearby water supplies can be contaminated by effluent because of the shallowness to ground water.

Digging and trenching are hampered by the flood hazard and wetness. It may be necessary to use pumps at excavation sites when the water table is high. Excavations can be damaged by floodwater. Cutbanks can collapse if excavations extend into the coarse-textured substratum.

The hazard of flooding is the major limitation to the use of these soils as sites for houses. Houses with basements are affected by the high water table during the peak of the irrigation season.

The hazard of flooding is the major limitation to the use of these soils as sites for construction of roads and streets.

This map unit is in capability subclass IVs, irrigated.

113-Ola-Searles complex, 15 to 30 percent slopes. The soils in this complex are on side slopes on mountains. The elevation is 3,000 to 5,000 feet. The average annual precipitation is 16 inches, the average annual temperature is 45 degrees F, and the frost-free period is about 100 days.

About 60 percent of the complex is Ola loam, and 20 percent is Searles gravelly loam. The rest is Ladd loam, 15 to 30 percent slopes; Rainey coarse sandy loam, 15 to 30 percent slopes; and Rock outcrop.

The Ola soil is moderately deep and well drained. It formed mainly in material that weathered from granite. This soil is commonly on side slopes that have a northerly aspect. Typically, the surface layer in the upper 11 inches is very dark grayish brown loam; below that, it is grayish brown fine gravelly sandy loam about 17 inches thick. The underlying material consists of pale brown and very pale brown loam and fine gravelly sandy loam about 7 inches thick and of partially decomposed granite about 3 inches thick. Below that is unweathered granite. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the Ola soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Searles soil is moderately deep and well drained. It formed in material that weathered from granite. This soil is commonly on side slopes that have a southerly aspect. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; and below that, it is pale brown very gravelly coarse sandy clay loam about 16 inches thick. Fractured granite underlies the subsoil. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches.

The available water capacity is moderate. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community on the Ola soil is dominated by Idaho fescue, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Idaho fescue and bluebunch wheatgrass are gradually replaced by cheatgrass, fescue, and medusahead wildrye. Forbs, bluegrass, and big sagebrush increase.

This Ola soil is best suited to grazing in summer. If the range is in poor condition, it can be reseeded to intermediate wheatgrass, brome grass, alfalfa, or other suitable plants. Seedings are most successful early in spring.

The potential natural plant community on the Searles soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This Searles soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

The use of these soils for residential development is limited by slope, inaccessibility, and depth to rock. This complex is in capability subclass VIe, nonirrigated.

114-Ola-Searles complex, 30 to 80 percent slopes. The soils in this complex are on side slopes on mountains. The elevation is 3,000 to 5,000 feet. The average annual precipitation is 16 inches, the average annual temperature is 45 degrees F, and the frost-free period is about 100 days.

About 60 percent of the complex is Ola loam, and 20 percent is Searles gravelly loam. The rest is Ladd loam, 30 to 60 percent slopes; Rainey coarse sandy loam, 30 to 65 percent slopes; and Rock outcrop.

The Ola soil is moderately deep and well drained. It formed mainly in material that weathered from granite. This soil is commonly on side slopes that have a northerly aspect. Typically, the surface layer in the upper 11 inches is very dark grayish brown loam; below that, it is grayish brown fine gravelly sandy loam about 17 inches thick. The underlying material consists of pale brown and very pale brown loam and fine gravelly sandy loam about 7 inches thick and of partially decomposed granite about 3 inches thick. Below that is unweathered granite. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the Ola soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The Searles soil is moderately deep and well drained. It formed in material that weathered from granite. This

soil is commonly on side slopes that have a southerly aspect. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is pale brown very gravelly coarse sandy clay loam about 16 inches thick. Fractured granite underlies the subsoil. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on the Ola soil is dominated by Idaho fescue, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Idaho fescue and bluebunch wheatgrass are gradually replaced by cheatgrass, fescue, and medusahead wildrye. Forbs, bluegrass, and big sagebrush increase.

This Ola soil is best suited to grazing in summer. Range seeding by conventional methods is not practical because of the steep slopes.

The potential natural plant community on the Searles soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Searles soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is not practical because of the steep slopes.

This complex is in capability subclass VIle, nonirrigated.

115-Oliaga Variant loam. This soil is deep and somewhat poorly drained. It formed in mixed alluvium on alluvial terraces. Slopes range from 0 to 3 percent. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown loam about 7 inches thick. The underlying material in the upper part is pale brown, grayish brown, and light brownish gray loam about 27 inches thick. In the lower part it is very pale brown and variegated very gravelly loamy sand and very gravelly coarse sand to a depth of 60 inches or more.

Included in mapping are small areas of Abo silt loam, Aeric Haplaquepts, and Drax loam. These included soils make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage,

wheat, sugar beets, and alfalfa hay. Sweet corn, barley, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

Wetness is the major limitation to agriculture. The water table, which is at a depth of 3 to 5 feet during the peak of the irrigation season, limits the growth of some deep-rooted crops. It can also impede farm implements. Proper crop selection and irrigation water management are needed to offset this limitation. Tile drains can be used to lower the water table if an adequate outlet is available.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by wetness, cutbanks caving, low strength, and frost action potential.

The seasonal water table is a severe limitation to the use of this soil as septic tank absorption fields. If effluent is discharged into the water table, contamination of nearby water supplies is a hazard. Increasing the thickness of the unsaturated filter material over the water table with suitable fill material can help to reduce this hazard.

Digging and trenching are hampered by the seasonal water table. It may be necessary to use pumps at excavation sites in summer. Cutbanks can collapse if excavations extend into coarse textured alluvium.

Low strength is a limitation to the use of this soil as sites for houses without basements. The seasonal water table is a limitation for houses with basements unless drainage is provided. Low strength can affect foundations and other structures that support loads.

This soil is in capability subclass IIw, irrigated.

116-Payette-Quincy complex, 15 to 30 percent slopes. The soils in this complex are on alluvial terraces in the foothills. The elevation is 2,800 to 4,000 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Payette sandy loam, and 20 percent is Quincy fine gravelly loamy coarse sand. The rest is Brent low rainfall, sandy loam, 12 to 30 percent slopes; Haw loam, 15 to 30 percent slopes; Lankbush sandy loam, 15 to 30 percent slopes; and a soil that is similar to Payette sandy loam, 15 to 30 percent slopes, but is underlain by sandstone bedrock at a depth of 20 to 60 inches.

The Payette soil is very deep and well drained. It formed mainly in alluvium that derived from acid igneous material. Typically, the surface layer is grayish brown sandy loam about 17 inches thick. The subsoil is brown and yellowish brown sandy loam about 17 inches thick. The substratum is light yellowish brown and light gray loamy sand and coarse sand to a depth of 60 inches or more.

Permeability of the Payette soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Quincy soil is very deep and excessively drained. It formed in acid igneous mixed eolian material. Typically, the surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material, to a depth of 60 inches or more, consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and a few thin lamellae of brown fine gravelly sandy loam. This Quincy soil is 15 to 20 percent fine gravel throughout, therefore, it is outside the range of characteristics of the Quincy series.

Permeability of this Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow and the hazard of erosion is high or very high.

The soils in this complex are used primarily as rangeland and wildlife habitat. In some areas in the lower foothills, they are used for residential development.

The potential natural plant community on the Payette soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Payette soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and needleandthread are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This Quincy soil is best suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass, crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

These soils are highly erodible if the vegetation is removed; therefore, grazing management is essential.

The use of the soils in this complex for residential development and most other engineering purposes is limited primarily by slope and inaccessibility. A hazard of seepage in the substratum, and unstable cutbanks, are additional limitations to this use.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill

slopes can be difficult on the Payette soil unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIe, nonirrigated.

117-Payette-Quincy complex, 30 to 65 percent slopes.

The soils in this complex are on alluvial terraces in the foothills. The elevation is 2,800 to 4,000 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Payette sandy loam, and 20 percent is Quincy fine gravelly loamy coarse sand. The rest is Brent low rainfall, 30 to 65 percent slopes; Haw loam, 30 to 60 percent slopes; Lankbush sandy loam, 30 to 60 percent slopes; and a soil that is similar to Payette sandy loam, 30 to 65 percent slopes, but is underlain by sandstone bedrock at a depth of 20 to 60 inches.

The Payette soil is very deep and well drained. It formed mainly in alluvium from acid igneous material. Typically, the surface layer is grayish brown sandy loam about 17 inches thick. The subsoil is brown and yellowish brown sandy loam about 17 inches thick. The substratum is light yellowish brown and light gray loamy sand and coarse sand to a depth of 60 inches or more.

Permeability of the Payette soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The Quincy soil is very deep and excessively drained. It formed in acid igneous mixed eolian material. Typically, the surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material, to a depth of 60 inches or more, consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and of a few thin lamellae of brown fine gravelly sandy loam. This Quincy soil is 15 to 20 percent fine gravel throughout; therefore, it is outside the range of characteristics of the Quincy series.

Permeability of this Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is very high.

The soils in this complex are used primarily as rangeland and wildlife habitat.

The potential natural plant community on the Payette soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This Payette soil is best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and

needleandthread are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This Quincy soil is best suited to grazing in spring and late in fall. Range seeding by conventional methods is limited by the steep slopes.

These soils are highly erodible if the vegetation is removed; therefore, grazing management is essential.

This complex is in capability subclass Vlle, nonirrigated.

118-Peasley silty clay loam, 2 to 6 percent slopes.

This soil is moderately deep to a hardpan, and it is well drained. It formed in a mantle of granitic alluvium and loess over basalt. It is on basalt plains. The elevation is 2,800 to 3,500 feet. The average annual precipitation is 14 inches, the average annual temperature is 49 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer in the upper 7 inches is brown silty clay loam; and in the lower 9 inches, it is brown silty clay. The underlying material consists of light yellowish brown clay about 5 inches thick, a pale brown hardpan about 14 inches thick, and below that, very pale brown fine gravelly loamy sand about 7 inches thick. Below that is highly fractured basalt. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Chilcott silt loam, 2 to 4 percent slopes; Kunaton silty clay loam; and areas of this Peasley soil that have stones on the surface. These soils make up about 15 percent of this map unit.

Permeability is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is slow or medium, and the hazard of erosion is slight or moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for dryland wheat and residential development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, biscuitroot, and big sagebrush. If the range deteriorates, the perennial grasses decrease and are gradually replaced by medusahead wildrye.

This soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, or alfalfa. There is a significant chance of seeding failure because of severe competition from annuals and because of soil characteristics that make seedbed preparation difficult. Seedlings are most successful late in fall or early in spring. Deep, wide cracks develop in this soil late in summer; they may be a hazard to livestock.

The use of this soil for residential development is limited primarily by the moderate depth to the cemented pan and the underlying bedrock, the slow permeability, and the shrink-swell potential.

The depth of the root zone, the annual churning of the upper 20 inches of the soil, and a heavy plow layer are

the major limitations to dry farming. The selection of suitable crops and tillage practices is needed to help overcome these limitations.

This map unit is in capability subclass IVe, nonirrigated.

119-Pipeline silt loam, 0 to 2 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by coarse-textured alluvium. It is on alluvial terraces. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is pale brown and light yellowish brown silty clay loam and silt loam about 8 inches thick. The substratum consists of pale brown silt loam about 3 inches thick, a white hardpan about 14 inches thick, and, to a depth of 60 inches or more, variegated very gravelly sand. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Chilcott silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; and Power silt loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is moderate. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The shallowness of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome this limitation.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass gradually decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass or Siberian wheatgrass. Seedlings

are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. The low available water capacity limits plant growth late in summer and early in fall.

The use of this soil for residential development is limited mainly by the hardpan, low strength, frost action potential, and cutbank caving below the hardpan.

The shallowness to the hardpan limits this soil for use as sites for houses with and without basements. This hardpan can be penetrated by power equipment.

The shallowness to the hardpan, which restricts the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the thickness of the unsaturated soil material above the hardpan with fill material to provide an effective filtering zone. Septic tank operation can be improved if the hardpan is excavated and tile lines are placed in the sediments below the pan. However, if effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. Cutbanks may collapse if excavations extend into coarse textured alluvium.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IVs, irrigated, and VIs, nonirrigated.

120-Pipeline silt loam, 2 to 4 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by coarse-textured alluvium. It is on alluvial terraces. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is pale brown and light yellowish brown silty clay loam and silt loam about 8 inches thick. The substratum consists of pale brown silt loam about 3 inches thick, a white hardpan about 14 inches thick, and, to a depth of 60 inches or more, variegated very gravelly sand. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Chilcott silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; and Power silt loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage,

wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The shallowness of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome this limitation.

Border, furrow, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass gradually decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years, the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The use of this soil for residential development is limited mainly by the hardpan, low strength, frost action potential, and cutbank caving below the hardpan.

The shallowness to the hardpan limits this soil for use as sites for houses with and without basements. This hardpan can be penetrated by power equipment.

The shallowness to the hardpan, which restricts the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the thickness of the unsaturated soil material above the hardpan with suitable fill material to provide an effective filtering zone. Septic tank operation can be improved if the hardpan is excavated and tile lines are placed in the sediments below the pan. However, if effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. Cutbanks may collapse if excavations extend into coarse textured alluvium.

The low strength of the soil and hazard of frost action in the soil limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IVe, irrigated, and VIs, nonirrigated.

121-Pipeline silt loam, 4 to 8 percent slopes. This soil is shallow to a hardpan, and it is well drained. It

formed in loess or silty alluvium that is underlain by coarse-textured alluvium. It is on alluvial terraces. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is pale brown and light yellowish brown silty clay loam and silt loam about 8 inches thick. The substratum consists of pale brown silt loam about 3 inches thick, a white hardpan about 14 inches thick, and, to a depth of 60 inches or more, variegated very gravelly sand. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Chilcott silt loam, 4 to 8 percent slopes; Elijah silt loam, 4 to 8 percent slopes; and Power silt loam, 4 to 8 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and the depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome this limitation. Sprinkling is the most effective method of irrigation for this soil.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass gradually decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity restricts plant growth.

The use of this soil for residential development is limited mainly by the shallowness to hardpan, low strength, frost action potential, and cutbank caving below the hardpan.

The shallowness to the hardpan limits this soil for use as sites for houses with and without basements. This hardpan can be penetrated by power equipment.

The shallowness to the hardpan, which restricts the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the thickness of the unsaturated soil material above the hardpan with fill material to provide an effective filtering zone. Septic tank operation can be improved if the hardpan is excavated and tile lines are placed in the sediments below the pan. However, if effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. Cutbanks may collapse if excavations extend into coarse textured alluvium.

The low strength and frost action potential limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

122-Pipeline silt loam, 8 to 12 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by coarse-textured alluvium. It is on alluvial terraces. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is pale brown and light yellowish brown silty clay loam and silt loam about 8 inches thick. The substratum consists of pale brown silt loam about 3 inches thick, a white hardpan about 14 inches thick, and, to a depth of 60 inches or more, variegated very gravelly sand. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Power silt loam, 8 to 12 percent slopes, and a soil that is similar to Sebree silty clay loam, 4 to 8 percent slopes, but does not contain a hardpan. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is moderate. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and mint are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and the shallowness of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The moderately steep slopes of this soil create a moderate erosion hazard under irrigation. Proper crop selection

and irrigation water management are needed to overcome these limitations. Sprinkling is the most effective method of irrigation for this soil.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass gradually decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate; and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The use of this soil for residential development is limited mainly by the shallowness to the hardpan, low strength, frost action potential, and cutbanks caving below the hardpan.

The shallowness to the hardpan limits this soil for use as sites for houses with and without basements. This hardpan can be penetrated by power equipment.

The shallowness to the hardpan, which restricts the downward movement of effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the thickness of the unsaturated soil material above the hardpan with fill material to provide an effective filtering zone. Septic tank operation can be improved if the hardpan is excavated and tile lines are placed in the sediments below the pan. However, if effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. Cutbanks may collapse if excavations extend into coarse-textured alluvium.

The low strength of the soil and the hazard of frost action in the soil limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

123-Pits, gravel. This map unit consists of open excavations from which soil and gravel have been removed, exposing the underlying sediments. Gravel pits support little, if any, vegetation.

These pits are in areas of vast alluvial deposition; for example, the Tenmile drainage. Areas of this map unit that are too small to be delineated are indicated on the soil maps by a spot symbol.

124-Potratz silt loam, 0 to 2 percent slopes. This soil is moderately deep and well drained. It formed in loess on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the

average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam about 9 inches thick. The substratum is light gray and white silt loam and loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 0 to 2 percent slopes; McCain silt loam, 0 to 2 percent slopes; Minidoka silt loam, bedrock substratum, 2 to 4 percent slopes; Power silt loam, 0 to 2 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The bedrock hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper irrigation water management and crop selection are needed to overcome this limitation.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the intake rate, accelerated erosion will occur.

The use of this soil for residential development is limited by the depth to rock and a hazard of frost action.

This map unit is in capability subclass IIc, irrigated, and VIc, nonirrigated.

125-Potratz silt loam, 2 to 4 percent slopes. This soil is moderately deep and well drained. It formed in loess on basalt plains. The elevation is 2,600 to 3,100

feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam about 9 inches thick. The substratum is light gray and white silt loam and loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 2 to 4 percent slopes; McCain silt loam, 2 to 4 percent slopes; Minidoka silt loam, bedrock substratum, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 15 to 20 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone and the hazard of erosion are the major limitations to agriculture. The bedrock hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the intake rate, accelerated erosion will occur.

The use of this soil for residential development is limited by the depth to rock and a hazard of frost action.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

126-Potratz silt loam, 4 to 8 percent slopes. This soil is moderately deep and well drained. It formed in

loess on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam about 9 inches thick. The substratum is light gray and white silt loam and loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 4 to 8 percent slopes; McCain silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 15 to 20 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, oats, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone and the hazard of erosion are the major limitations to agriculture. The bedrock hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Sprinkling is the most effective method of irrigation on this soil.

The use of this soil for residential development is limited by the depth to rock and a hazard of frost action.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

127-Potratz-Power silt loams, 4 to 8 percent slopes. The soils in this complex are on alluvial and basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 70 percent of the complex is Potratz silt loam, and 20 percent is Power silt loam. The rest is Scism silt loam, 4 to 8 percent slopes; Trevino extremely stony silt

loam, 5 to 20 percent slopes; and Truesdale fine sandy loam, 4 to 8 percent slopes.

The Potratz soil is moderately deep and well drained. It formed mainly in loess that is underlain by basalt. Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam about 9 inches thick. The substratum is light gray and white silt loam and loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of this Potratz soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of this Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used primarily for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, and alfalfa hay. Sweet corn, barley, and potatoes are also grown. In nonirrigated areas, these soils are used as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The hazard of erosion and the depth of the root zone are the major limitations to agriculture. Erosion can be controlled by stubble mulching, contour plowing, and management of irrigation water. In the Potratz soil, the bedrock hinders the growth of some deep-rooted crops. Proper crop selection is needed to overcome this limitation.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on these soils is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Seedlings are most successful late in fall.

The depth to rock, slope, and frost action potential are limitations to the use of the Potratz soil as sites for

residential development. The moderately slow permeability, shrink-swell potential, and frost action potential are limitations to this use on the Power soil.

This complex is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

128-Potratz-Trevino complex, 4 to 12 percent slopes.

The soils in this complex formed in loess on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 50 percent of the complex is Potratz silt loam, and 35 percent is Trevino extremely stony silt loam. The rest is Scism silt loam, bedrock substratum, 4 to 12 percent slopes, and Trio very fine sandy loam, 4 to 8 percent slopes.

The Potratz soil is moderately deep and well drained. Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown and brown silt loam about 9 inches thick. The substratum is light gray and white loam and silt loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from about 20 to 40 inches.

Permeability of this Potratz soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Trevino soil is shallow and well drained. Typically, the surface layer is light brownish gray extremely stony silt loam about 4 inches thick. The subsoil is pale brown stony silt loam about 6 inches thick. The substratum is very pale brown and white silt loam and loam about 9 inches thick. It is underlain by highly fractured basalt. Depth to bedrock ranges from 10 to 20 inches.

Permeability of this Trevino soil is moderate. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are wheat and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The bedrock hinders the growth of deep-

rooted crops. Sprinkling is the most suitable method of irrigation.

The use of these soils for residential development is limited by the slope, depth to rock, and frost action potential.

This complex is in capability subclass IVe, irrigated, and VIe, nonirrigated.

129-Power silt loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces and basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Included in mapping are small areas of Abo silt loam; Brent loam, low rainfall, 0 to 2 percent slopes; Chilcott silt loam, 0 to 2 percent slopes; Colthorp silt loam, 0 to 2 percent slopes; Potratz silt loam, 0 to 2 percent slopes; Purdam silt loam, 0 to 2 percent slopes; Scism silt loam, 0 to 2 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

This soil has few limitations to farming. Returning crop residue to the soil and turning under green manure crops help to maintain and increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil, thus aiding seedling emergence and water penetration. Soil amendments are particularly necessary if Sebree silty clay loam is an inclusion. Deep plowing, to a depth of 2 or 3 feet, mixes the soil material and improves the physical characteristics of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease

and are gradually replaced by cheatgrass and other annuals.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

Shrink-swell potential limits this soil for use as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, shrink-swell potential, and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This soil is in capability class I, irrigated, and subclass VIc, nonirrigated.

130-Power silt loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces and basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Included in mapping are small areas of Abo silt loam; Brent loam, low rainfall, 2 to 4 percent slopes; Chilcott silt loam, 2 to 4 percent slopes; Colthorp silt loam, 2 to 4 percent slopes; Potratz silt loam, 2 to 4 percent slopes; Purdam silt loam, 2 to 4 percent slopes; Scism silt loam, 2 to 4 percent slopes; and Sebree silty clay loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion is the major limitation to farming. Proper irrigation water management is needed to overcome this limitation. Returning crop residue to the soil and turning under green manure crops help to maintain and increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil, thus aiding seedling emergence and water penetration. Soil amendments are particularly necessary if Sebree silty clay loam is an inclusion. Deep plowing, to a depth of 2 or 3 feet, mixes the soil material and improves the physical characteristics of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential limits this soil for use as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, shrink-swell potential, and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This soil is in capability subclass IIe, irrigated, and VIc, nonirrigated.

131-Power silt loam, 4 to 8 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces and basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light

yellowish brown and very pale brown loam to a depth of 60 inches or more.

Included in mapping are small areas of Abo silt loam; Brent loam, low rainfall, 4 to 8 percent slopes; Chilcott silt loam, 4 to 8 percent slopes; Potratz silt loam, 4 to 8 percent slopes; Purdam silt loam, 4 to 8 percent slopes; Scism silt loam, 4 to 8 percent slopes; and Sebree silt loam, 4 to 8 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In nonirrigated areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion is the major limitation to farming. Proper irrigation water management is needed to overcome this limitation. Returning crop residue to the soil and turning under green manure crops help to maintain and increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil, thus aiding seedling emergence and water penetration. Soil amendments are particularly necessary if Sebree silty clay loam is an inclusion. Deep plowing, to a depth of 2 or 3 feet, mixes the soil material and improves the physical characteristics of the soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential limits this soil for use as sites for houses with basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, shrink-swell potential, and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations.

This soil is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

132-Power silt loam, 8 to 12 percent slopes. This soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces and basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Included in mapping are small areas of Abo silt loam; Brent loam, 8 to 12 percent slopes; McCain silt loam, 8 to 12 percent slopes; and Scism silt loam, bedrock substratum, 8 to 12 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion is the major limitation to farming. Proper irrigation water management is needed to overcome this limitation. Returning crop residue to the soil and turning under green manure crops help to maintain and increase the content of organic matter. Deep plowing, to a depth of 2 or 3 feet, mixes the soil material and improves the physical characteristics of the soil.

Sprinkling is the most suitable method of irrigation for this soil. If the application rate exceeds the intake rate, accelerated erosion will occur.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited by slope, moderately slow permeability, low strength, shrink-swell potential, and frost action potential.

The moderately slow permeability limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The slope and the shrink-swell potential limit this soil for use as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, shrink-swell potential, slope, and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset the low strength and shrinking and swelling.

This soil is in capability subclass IVe, irrigated, and VIe, nonirrigated.

133-Power-McCain silt loams, 0 to 2 percent slopes. The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain silt loam. The rest is Chilcott silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from about 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for

irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, alfalfa hay, sweet corn, barley, beans, and potatoes. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Power soil is well suited to agriculture. The McCain soil is limited for agriculture mainly by the depth of the root zone. The bedrock hinders the growth of some deep-rooted crops.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops; however the rate of application should not exceed the rate at which water moves into the soil, in order to prevent erosion.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to bedrock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

134-Power-McCain silt loams, 2 to 4 percent slopes.

The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain silt loam. The rest is Chilcott silt loam, 2 to 4 percent slopes; Elijah silt loam, 2 to 4 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, alfalfa hay, sweet corn, barley, beans, and potatoes. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Power soil is well suited to agriculture; however, the hazard of erosion is a limitation. Depth to bedrock, which hinders the growth of some deep-rooted crops, and the hazard of erosion are limitations to this use on the McCain soil. These limitations should be considered in crop selection and irrigation water management.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops; however, in order to prevent erosion, the rate of application should not exceed the rate at which water moves into the soil.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to bedrock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IIe, irrigated, and VIc, nonirrigated.

135-Power-McCain silt loams, 4 to 8 percent slopes. The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain silt loam. The rest is Chilcott silt loam, 4 to 8 percent slopes; Elijah silt loam, 4 to 8 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, sugar beets, alfalfa hay, sweet corn, barley, beans, and potatoes. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Power soil is well suited to agriculture. Depth of the root zone is a limitation to this use on the McCain soil. The bedrock hinders the growth of some deep-rooted crops.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the intake rate, accelerated erosion will occur.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to bedrock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

136-Power-McCain silt loams, 8 to 12 percent slopes. The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain silt loam. The rest is Chilcott silt loam, 8 to 12 percent slopes; Elijah silt loam, 8 to 12 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown silt loam. The subsoil is brown and very pale brown silty clay loam and silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are wheat and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other

suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The depth of the root zone, hazard of erosion, and other problems related to slope are the major limitations to agriculture. Sprinkling is the most suitable method of irrigating crops on this soil.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to rock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IVe, irrigated, and VIe, nonirrigated.

137-Power-McCain complex, 0 to 2 percent slopes.

The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain stony silt loam. The rest is Chilcott silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown stony silt loam. The subsoil is brown and very pale brown silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, oats, and wheat. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sa-

gebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Power soil is well suited to agriculture. Limitations to this use on the McCain soil are the stones on the surface and the depth of the root zone. The bedrock hinders the growth of some deep-rooted crops.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the rate at which the water moves into the soil, accelerated erosion will occur.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to rock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass II_s, irrigated, and VI_c, nonirrigated.

138-Power-McCain complex, 2 to 4 percent slopes.

The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain very stony silt loam. The rest is Chilcott silt loam, 2 to 4 percent slopes; Elijah silt loam, 2 to 4 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown very stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15

inches thick. The substratum is white and light gray loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and oats. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The Power soil is well suited to agriculture. The hazard of erosion, depth of the root zone, and stones on the surface are limitations to this use on the McCain soil. The bedrock hinders the growth of some deep-rooted crops.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops. If the rate of application exceeds the rate at which the water moves into the soil, accelerated erosion will occur.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to rock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IVe, irrigated, and VIc, nonirrigated.

139-Power-McCain complex, 4 to 8 percent slopes.

The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 60 percent of the complex is Power silt loam, and 30 percent is McCain very stony silt loam. The rest is Chilcott silt loam, 4 to 8 percent slopes; Elijah silt loam, 4 to 8 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam

about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The McCain soil is moderately deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is pale brown very stony silt loam. The subsoil is brown and very pale brown stony silty clay loam and stony silt loam about 15 inches thick. The substratum is white and light gray stony loam about 11 inches thick. It is underlain by basalt. Depth to the bedrock ranges from about 20 to 40 inches.

Permeability of the McCain soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. Wheat is the major crop. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The hazard of erosion, stones, and depth of the root zone are the major limitations to agriculture on the McCain soil. The hazard of erosion is the major limitation to agriculture on the Power soil. Sprinkling is the most suitable method of irrigating crops on these soils.

The use of these soils for residential development is limited by the moderately slow permeability, low strength, shrink-swell potential, and frost action potential. Depth to rock is an additional limitation to this use on the McCain soil.

This complex is in capability subclass IVe, irrigated, and VIe, nonirrigated.

140-Power-Potratz silt loams, 2 to 4 percent slopes.

The soils in this complex are on basalt plains and low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 70 percent of the complex is Power silt loam, and 20 percent is Potratz silt loam. The rest is McCain silt loam, 2 to 4 percent slopes; Rock outcrop; Sebree silty clay loam, 2 to 4 percent slopes; Scism silt loam, 2 to 4 percent slopes; and Trevino extremely stony silt loam, 5 to 20 percent slopes.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by basalt. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of the Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

The Potratz soil is moderately deep and well drained. It formed in loess that is underlain by basalt. Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam about 9 inches thick. The substratum is light gray and white silt loam and loam about 19 inches thick. It is underlain by basalt. Depth to the bedrock ranges from 20 to 40 inches.

Permeability of the Potratz soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, these soils are used as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The hazard of erosion is the major limitation to agriculture on these soils. This limitation should be considered in the management of irrigation water. The depth of the root zone is an additional major limitation to agriculture on the Potratz soil; the bedrock limits the growth of some deep-rooted crops.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. In some years the available moisture is

inadequate, and there is a moderate chance of seeding failure. Seedlings are most successful late in fall.

The use of the Power soil as sites for residential development is limited by the moderately slow permeability, shrink-swell potential, low strength, and frost action potential. The depth to rock and frost action potential are limitations to this use on the Potratz soil.

This complex is in capability subclass IIe, irrigated, and VIc, nonirrigated.

141-Purdam silt loam, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 10 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Abo silt loam; Elijah silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. This weakly cemented hardpan can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease

and are gradually replaced by cheatgrass and other annuals. Big sagebrush and Sandberg bluegrass increase.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the cemented pan, shrink-swell potential, unstable cutbanks, low strength, and frost action potential.

The use of this soil as septic tank absorption fields is limited by the depth to the hardpan, which restricts the downward movement of the effluent. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption areas can be used if space is limited. If effluent is discharged into the coarse-textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment. Cutbanks may collapse if excavations extend into the coarse-textured alluvium below the hardpan.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIs, irrigated, and VIc, nonirrigated.

142-Purdam silt loam, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Abo silt loam; Elijah silt loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root

zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and the depth of the root zone are the major limitations to agriculture. The hazard of erosion can be offset through proper management of irrigation water. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. This weakly cemented hardpan can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush and Sandberg bluegrass increase.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the depth to the hardpan, shrink-swell potential, unstable cutbanks, low strength, and frost action potential.

The depth to the hardpan, which restricts the downward movement of the effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption areas can be used if space is limited. If effluent is discharged into the coarse-textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment. Cutbanks may collapse if excavations extend into the coarse-textured alluvium below the hardpan.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

143-Purdam silt loam, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. It is on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Elijah silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; and Sebree silty clay loam, 4 to 8 percent slopes. These included soils make up about 10 percent of this map unit.

Permeability is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is moderate, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and the depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. This weakly cemented hardpan can be ripped by heavy equipment. The hazard of erosion can be offset through proper management of irrigation water.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush and Sandberg bluegrass increase.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of this soil for residential development is limited mainly by the depth to the hardpan, hazard of seepage in the lower part of the substratum, shrink-swell potential, unstable cutbanks, low strength, and frost action potential.

The depth to the hardpan, which restricts the downward movement of the effluent, limits this soil for use as septic tank absorption fields. This limitation can generally be offset by increasing the size of the absorption field. Mound-type absorption areas can be used if space is limited. If effluent is discharged into the coarse-textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan. This hardpan can be penetrated by power equipment. Cutbanks may collapse if excavations extend into the coarse-textured alluvium below the hardpan.

This soil is well suited to use as sites for houses without basements. The construction of houses with basements is hampered by the hardpan.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads and streets. Suitable subgrade material can help offset these limitations.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

144-Purdam-Power silt loams, 0 to 2 percent slopes. The soils in this complex are on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 55 percent of the complex is Purdam silt loam, and 30 percent is Power silt loam. The rest is Abo silt loam; Colthorp silt loam, 0 to 2 percent slopes; Elijah silt loam, 0 to 2 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes.

The Purdam soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Purdam soil is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is very slow, and the hazard of erosion is slight.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown,

yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of this Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very slow, and the hazard of erosion is slight.

In most areas, these soils are used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, these soils are used as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The depth of the root zone is the major limitation to agriculture on the Purdam soil. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome this limitation. The weakly cemented hardpan can be ripped by heavy equipment. There are no major limitations to agriculture on the Power soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Seedlings are most successful late in fall.

The use of these soils for residential development is limited by shrink-swell potential, low strength, moderately slow permeability, and frost action potential. The Purdam soil is also limited by the hardpan.

The moderately slow permeability limits these soils for use as septic tank absorption fields. Hardpan is an additional limitation to this use on the Purdam soil. These limitations can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. In low density residential areas, ripping the hardpan is another alternative. However, if effluent is discharged into the coarse-textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Cutbanks may cave if digging and trenching extend into the coarse-textured alluvium. The hardpan in the Purdam soil hampers digging and trenching.

The Purdam soil is well suited to use as sites for houses without basements. The hardpan is a limitation to

the use of this soil as sites for houses with basements. Shrink-swell potential of the subsoil is a limitation to the use of the Power soil as sites for houses with and without basements. Suitable backfill material can minimize the stress on the basement walls that is caused by the shrinking and swelling.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations. Hardpan is an additional limitation to the construction of paved surfaces on the Purdam soil.

This complex is in capability subclass IIs, irrigated, and VIc, nonirrigated.

145-Purdam-Power silt loams, 2 to 4 percent slopes.

The soils in this complex are on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 55 percent of the complex is Purdam silt loam, and 30 percent is Power silt loam. The rest is Colthorp silt loam, 2 to 4 percent slopes; Elijah silt loam, 2 to 4 percent slopes; and Sebree silty clay loam, 0 to 2 percent slopes.

The Purdam soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Purdam soil is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of this Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, these soils are used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas,

these soils are used as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The depth of the root zone and the hazard of erosion on the Purdam soil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to overcome this limitation. The hardpan is weakly cemented and can be ripped by heavy equipment. There are no major limitations to agriculture on the Power soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Seedlings are most successful late in fall.

The use of the Purdam soil for residential development is limited by the low strength, moderately slow permeability, unstable cutbanks, shrink-swell potential, frost action potential, and the hardpan.

The moderately slow permeability limits these soils for use as septic tank absorption fields. Hardpan is an additional limitation to this use on the Purdam soil. These limitations can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. In low density residential areas, ripping the hardpan is beneficial. However, if effluent is discharged into the coarse-textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Cutbanks may cave if digging and trenching operations extend into coarse-textured alluvium. The hardpan in the Purdam soil hampers digging and trenching.

Purdam soils are well suited to use as sites for houses without basements. The depth to the hardpan is a limitation to the use of this soil as sites for houses with basements. The shrink-swell potential of the subsoil is a limitation to the use of the Power soil as sites for houses with and without basements. Suitable backfill material can minimize the stress on the basement walls that is caused by the shrinking and swelling.

The low strength, frost action potential, and shrink-swell potential limit the construction of roads and streets. Suitable subgrade material can help offset these limitations. The hardpan is an additional limitation to the construction of roads and streets on the Purdam soil.

This complex is in capability subclass IIe, irrigated, and VIc, nonirrigated.

146-Purdam-Power silt loams, 4 to 8 percent slopes.

The soils in this complex are on low alluvial terraces. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 55 percent of the complex is Purdam silt loam, and 30 percent is Power silt loam. The rest is Colthorp silt loam, 4 to 8 percent slopes; Elijah silt loam, 4 to 8 percent slopes; and Sebree silty clay loam, 4 to 8 percent slopes.

The Purdam soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of the Purdam soil is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of this Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, these soils are used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, and oats are also grown. In some areas, these soils are used as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The depth of the root zone and the hazard of erosion on the Purdam soil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset this limitation. The weakly cemented hardpan can be ripped by heavy equipment. There are no major limitations to agriculture on the Power soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The border and

corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Seedlings are most successful late in fall.

Depth to hardpan, moderately slow permeability, unstable cutbanks, shrink-swell potential, and frost action potential are limitations to residential development on the Purdam soil. Moderately slow permeability, shrink-swell potential, low strength, and frost action potential are limitations to this use of the Power soil.

This complex is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

147-Purdam-Power-Urban land complex, 0 to 2 percent slopes. The soils and the Urban land in this complex are on low alluvial terraces. The elevation is 2,500 to 3,000 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 40 percent of the complex is Purdam silt loam, 30 percent is Power silt loam, and 20 percent is Urban land. The rest is Abo silt loam, and Elijah silt loam, 0 to 2 percent slopes.

The Purdam soil is moderately deep to a hardpan. It formed in loess or silty alluvium underlain by mixed alluvium. Typically, the surface layer is light brownish gray silt loam about 10 inches thick. The subsoil is light brownish gray and pale brown silty clay loam and silt loam about 12 inches thick. The substratum consists of very pale brown silt loam and loam about 15 inches thick; a light yellowish brown, weakly cemented hardpan about 12 inches thick; and, to a depth of 60 inches or more, light gray sandy loam. Depth to the hardpan is 20 to 40 inches.

Permeability of this Purdam soil is moderately slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is very slow, and the hazard of erosion is slight.

The Power soil is very deep and well drained. It formed in loess or silty alluvium that is underlain by mixed alluvium. Typically, the surface layer is pale brown silt loam about 6 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown silt loam and silty clay loam about 21 inches thick. The substratum is light yellowish brown and very pale brown loam to a depth of 60 inches or more.

Permeability of this Power soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

Urban land consists of areas that are covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

The soils in this complex are used mainly for residential development. In some areas they are used for irrigated crops and pasture. The major crops are wheat, barley, oats, and alfalfa hay. Most areas of cropland are 10 acres or less in size.

The use of the soils for residential development is limited primarily by the moderately slow permeability, unstable cutbanks, frost action potential, low strength, and shrink-swell potential. Hardpan is an additional limitation to this use on the Purdam soil.

The moderately slow permeability limits these soils for use as septic tank absorption fields. Hardpan is an additional limitation to this use on the Purdam soil. These limitations can generally be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited. Ripping the hardpan is another alternative. However, if effluent is discharged into the coarse textured alluvium below the hardpan, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by the hardpan in the Purdam soil. This hardpan can be penetrated by power equipment. Cutbanks may collapse if excavations extend into the coarse-textured alluvium below the hardpan.

The Purdam soil is well suited to use as sites for houses without basements. The hardpan in this Purdam soil hampers the construction of houses with basements. Shrink-swell potential limits the use of the Power soil as sites for houses with and without basements. Suitable backfill material can minimize the stress on basement walls that is caused by the shrinking and swelling.

The low strength, shrink-swell potential, and frost action potential limit the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset these limitations. Hardpan is an additional limitation to construction on the Purdam soil.

The depth of the root zone is the major limitation to farming on the Purdam soil. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. This weakly cemented hardpan can be ripped by heavy equipment. There are no major limitations to farming on the Power soil.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on these soils. The corrugation and border systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

This complex is in capability subclass IIs, irrigated.

148-Quincy sand, 2 to 8 percent slopes. This soil is very deep and excessively drained. It formed in mixed

eolian sands. It makes up active sand dunes on alluvial terraces and on basalt plains that are covered by loess. The elevation is 2,500 to 2,900 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is light brownish gray sand about 8 inches thick. The underlying material is light brownish gray and variegated sand to a depth of 60 inches or more.

Included in mapping are small areas of Feltham loamy sand, 0 to 10 percent slopes, and Rubble land. These inclusions make up about 10 percent of this map unit.

Permeability is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is low. Runoff is medium, and the hazard of wind erosion is high.

In most areas, this soil is used as wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, sweet corn, and potatoes. Corn silage, wheat, and alfalfa hay are also grown.

The hazard of wind erosion, the rapid permeability, and the low available water capacity are the major limitations to agriculture. Proper crop selection and irrigation water management are needed to overcome these limitations. Returning crop residue to the soil and turning under green manure crops help to maintain and increase the content of organic matter.

The use of this soil for residential development is hampered by unstable cutbanks. Establishing lawns, gardens, and ornamental plants is difficult because of the droughtiness.

This soil is in capability subclass IVe, irrigated, and VIIe, nonirrigated.

149-Quincy-B rent complex, 6 to 45 percent slopes. The soils in this complex are on alluvial terraces in foothills. The elevation is 3,000 to 3,600 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 35 percent of the complex is Quincy fine gravelly loamy coarse sand, and 30 percent is Brent sandy loam, low rainfall. The rest is Ladd loam, 4 to 30 percent slopes; a soil that is similar to Brent sandy loam, low rainfall, 4 to 30 percent slopes, but is underlain by sandstone at a depth of 20 to 40 inches; and sandstone outcrops.

The Quincy soil is very deep and excessively drained. It formed mainly in acid igneous eolian material. Typically, the surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and a few thin lamellae of brown fine gravelly sandy loam to a depth of 60 inches or more. This Quincy soil is 15 to 20 percent fine gravel throughout; therefore, it is outside the range of characteristics of the Quincy series.

Permeability of the Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow or medium, and the hazard of erosion is moderate.

The Brent soil is very deep and well drained. It formed in alluvium that derived from acid igneous material. Typically, the surface layer in the upper 5 inches is grayish brown sandy loam; below that, it is grayish brown and light brownish gray silt loam and loam about 13 inches thick. The subsoil is grayish brown, brown, and very pale brown clay about 22 inches thick. The substratum in the upper 6 inches is pink gravelly clay loam; below that, to a depth of 60 inches or more, it is pink gravelly loamy coarse sand.

Permeability of the Brent soil is very slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium through very rapid, and the hazard of erosion is moderate through high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and needleandthread are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This Quincy soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Indian ricegrass, crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The potential natural plant community on the Brent soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

Slope, inaccessibility, a hazard of seepage, and unstable cutbanks limit the Quincy soil for use as sites for residential development. Slope, inaccessibility, low strength, slow permeability in the subsoil, a hazard of seepage in the substratum, and shrink-swell potential are limitations to this use on the Brent soil (fig. 8).

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over

the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIIe, nonirrigated.

150-Quincy-Lankbush complex, 4 to 12 percent slopes. The soils in this complex are on alluvial terraces of the Boise Front. The elevation is 2,700 to 3,000 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Quincy fine gravelly loamy coarse sand, and 20 percent is Lankbush sandy loam. The rest is Brent sandy loam, low rainfall, 4 to 12 percent slopes, and Haw loam, 4 to 15 percent slopes.

The Quincy soil is very deep and excessively drained. It formed in acid igneous eolian material. Typically, the surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and a few thin lamellae of gravelly sandy loam to a depth of 60 inches or more. This Quincy soil is 15 to 20 percent fine gravel throughout;



Figure 8.-This roadbed failure occurred in an area of the Quincy-Brent complex, 6 to 45 percent slopes.

therefore, it is outside the range of characteristics of the Quincy series.

Permeability of the Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is slow, and the hazard of erosion is moderate.

The Lankbush soil is very deep and well drained. It formed in acid igneous alluvial or lacustrine deposits. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and needleandthread are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This Quincy soil is best suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass, crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, a grazing system is essential.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of the soils in this complex for residential development is limited by slope and unstable cutbanks. The moderately slow permeability, shrink-swell potential, low strength, and frost action potential are additional limitations to this use on the Lankbush soil.

The moderately slow permeability limits the Lankbush soil for use as septic tank absorption fields. Increasing the size of the absorption field can generally offset this limitation.

If the slope is 8 percent or more, these soils are limited for use as sites for houses. Shrink-swell potential is an additional limitation to this use on the Lankbush soil.

Suitable backfill material can minimize the stress on foundations and basement walls that is caused by the shrinking and swelling.

Low strength, frost action, and slope of more than 8 percent limit the construction of roads, and streets. Suitable subgrade material can help offset the low strength and frost action.

This complex is in capability subclass VIIe, nonirrigated.

151-Quincy-Lankbush complex, 12 to 30 percent slopes. The soils in this complex are on alluvial terraces of the Boise Front. The elevation is 2,800 to 3,800 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Quincy fine gravelly loamy coarse sand, and 20 percent is Lankbush sandy loam. The rest is Brent sandy loam, low rainfall, 12 to 30 percent slopes; Haw loam, 4 to 15 percent slopes; Payette sandy loam, 15 to 30 percent slopes; and Van Dusen loam, 30 to 65 percent slopes.

The Quincy soil is very deep and excessively drained. It formed in acid igneous eolian material. Typically, the surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material to a depth of 60 inches or more consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and a few thin lamellae of brown fine gravelly sandy loam. This Quincy soil is 15 to 20 percent fine gravel throughout; therefore, it is outside the range of characteristics of the Quincy series.

Permeability of the Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The Lankbush soil is very deep and well drained. It formed in acid igneous alluvial or lacustrine deposits. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and needleandthread are gradually replaced by red threeawn, cheatgrass, and big sagebrush.

This Quincy soil is best suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass, crested wheatgrass, Siberi-

an wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Lankbush soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure.

The use of these soils for residential development is limited mainly by slope. Moderately slow permeability, shrink-swell potential, low strength, and frost action potential are additional limitations to this use on the Lankbush soil. The sandy texture is an additional limitation to this use on the Quincy soil.

Slope is a limitation to the use of these soils as septic tank absorption fields. Moderately slow permeability is an additional limitation to this use on the Lankbush soil. Increasing the size of the absorption field can offset this limitation. Mound-type absorption fields can be used if space is limited. If effluent is discharged into the substratum or underlying material, contamination of nearby water supplies is a hazard.

The use of these sites for houses with and without basements is severely limited by the slope. The shrink-swell potential is an additional limitation to this use on the Lankbush soil. Suitable backfill material can minimize the stress on foundations and basement walls that is caused by the shrinking and swelling.

Low strength, frost action, and slope limit the construction of roads and streets. Suitable subgrade material can help offset the low strength and frost action.

This complex is in capability subclass VIIe, nonirrigated.

152-Quincy-Lankbush complex, 30 to 80 percent slopes. The soils in this complex are on alluvial terraces of the Boise Front. The elevation is 2,800 to 3,800 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 65 percent of the complex is Quincy fine gravelly loamy coarse sand, and 20 percent is Lankbush sandy loam. The rest is Brent sandy loam, low rainfall, 30 to 65 percent slopes; Haw loam, 25 to 40 percent slopes; Payette sandy loam, 30 to 65 percent slopes; and Van Dusen loam, 30 to 65 percent slopes.

The Quincy soil is very deep and excessively drained. It formed in acid igneous eolian material. Typically, the

surface layer is brown fine gravelly loamy coarse sand about 5 inches thick. The underlying material consists of pale brown, light brownish gray, and light gray fine gravelly loamy coarse sand and a few thin lamellae of brown fine gravelly sandy loam to a depth of 60 inches or more. This Quincy soil is 15 to 20 percent fine gravel throughout; therefore, it is outside the range of characteristics of the Quincy series.

Permeability of the Quincy soil is rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is moderate. Runoff is moderately rapid, and the hazard of erosion is high.

The Lankbush soil is very deep and well drained. It formed in alluvial or lacustrine deposits that derived from acid igneous material. Typically, the surface layer is brown and pale brown sandy loam about 11 inches thick. The subsoil is yellowish brown and pale brown clay loam and loam about 19 inches thick. The substratum is pale brown and very pale brown sandy loam to a depth of 60 inches or more.

Permeability of the Lankbush soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on the Quincy soil is dominated by Indian ricegrass and needleandthread. If the range deteriorates, Indian ricegrass and needleandthread are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This Quincy soil is best suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Indian ricegrass, crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The potential natural plant community on the Lankbush soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

153-Rainey-Ola coarse sandy loams, 15 to 30 percent slopes. The soils in this complex are on mountain side slopes of the Boise Front. The elevation is 3,000 to 5,000 feet. The average annual precipitation is 16 inches, the average annual temperature is 46 degrees F, and the frost-free period is about 100 days.

About 50 percent of the complex is Rainey coarse sandy loam, and 20 percent is Ola coarse sandy loam.

The rest is Ladd loam, 15 to 30 percent slopes; Searles fine gravelly loam, 15 to 30 percent slopes; and a soil that is similar to Rainey coarse sandy loam, 15 to 30 percent slopes, but is underlain by granitic bedrock at a depth of 10 to 20 inches.

The Rainey soil is moderately deep and well drained. It formed in material that weathered from acid igneous bedrock. Typically, the surface layer in the upper 7 inches is dark grayish brown coarse sandy loam; below that, it is loam about 5 inches thick. The underlying material consists of light brownish gray gravelly loam about 10 inches thick over highly weathered granite about 8 inches thick. Below that is somewhat disintegrated and weathered granite. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Rainey soil is moderately rapid. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Ola soil is moderately deep and well drained. It formed in material that weathered from granite. It is on side slopes that have a northerly aspect. Typically, the surface layer in the upper 11 inches is very dark grayish brown coarse sandy loam; below that, it is grayish brown fine gravelly sandy loam about 17 inches thick. The underlying material consists of pale brown and very pale brown fine gravelly sandy loam and loam about 7 inches thick over partially decomposed granite about 3 inches thick. Unweathered granite occurs at a depth of about 38 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Ola soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential development.

The potential natural plant community on the Rainey soil is dominated by bluebunch wheatgrass, bitterbrush, and big sagebrush. If the range deteriorates, plant density decreases, and cheatgrass and other annuals invade. Bitterbrush initially increases but may decrease as big sagebrush and rabbitbrush increase.

This Rainey soil is best suited to grazing from spring through fall. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedlings are most successful late in fall or early in spring.

This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The potential natural plant community on the Ola soil is dominated by Idaho fescue, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Idaho fescue and bluebunch wheatgrass are gradually replaced by cheatgrass and other annuals. Forbs, bluegrass, and big sagebrush increase.

This Ola soil is best suited to grazing in summer. If the range is in poor condition, it can be reseeded to interme-

diate wheatgrass, brome grass, alfalfa, or other suitable plants. Seedlings are most successful early in spring.

The use of the soils in this complex for residential development is severely limited by slope, inaccessibility, and depth to rock.

This complex is in capability subclass VIe, nonirrigated.

154-Rainey-Ola coarse sandy loams, 30 to 65 percent slopes. The soils in this complex are on mountain side slopes of the Boise Front. The elevation is 3,000 to 5,600 feet. The average annual precipitation is 16 inches, the average annual temperature is 46 degrees F, and the frost-free period is about 100 days.

About 50 percent of the complex is Rainey coarse sandy loam, and 20 percent is Ola coarse sandy loam. The rest is Ladd loam, 30 to 60 percent slopes; Searles fine gravelly loam, 30 to 65 percent slopes; and a soil that is similar to Rainey coarse sandy loam, 30 to 65 percent slopes, but is underlain by granitic bedrock at a depth of 20 to 40 inches.

The Rainey soil is moderately deep and well drained. It formed in material that weathered from acid igneous bedrock. Typically, the surface layer in the upper 7 inches is dark grayish brown coarse sandy loam; below that, it is light loam about 5 inches thick. The underlying material consists of light brownish gray gravelly loam about 10 inches thick over highly weathered granite about 8 inches thick. Below that is somewhat disintegrated and weathered granite. Depth to the weathered bedrock ranges from 20 to 40 inches.

Permeability of the Rainey soil is moderately rapid. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is very rapid, and the hazard of erosion is very high.

The Ola soil is moderately deep and well drained. It formed in material weathered from granite. It is on side slopes that have a northerly aspect. Typically, the surface layer in the upper 11 inches is very dark grayish brown coarse sandy loam; below that, it is grayish brown fine gravelly sandy loam about 17 inches thick. The underlying material consists of pale brown and very pale brown fine gravelly sandy loam and loam about 7 inches thick over partially decomposed granite about 3 inches thick. Below that is unweathered granite. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Ola soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community on the Rainey soil is dominated by bluebunch wheatgrass, bitterbrush, and big sagebrush. If the range deteriorates, plant density decreases and cheatgrass and other annuals invade. Bitterbrush initially increases but may decrease as big sagebrush and rabbitbrush increase.

This Rainey soil is best suited to grazing from spring through fall. Range seeding by conventional methods is limited by the steep slopes.

This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The potential natural plant community on the Ola soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This Ola soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

155-Ridenbaugh-Sebree silty clay loams, 0 to 2 percent slopes. The soils in this complex are on alluvial plains and high alluvial terraces. The elevation is 2,800 to 3,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 75 percent of the complex is Ridenbaugh silty clay loam, and 20 percent is Sebree silty clay loam. The rest is Chilcott silt loam, 0 to 2 percent slopes, and Kunaton silty clay loam, 0 to 2 percent slopes.

The Ridenbaugh soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium. Typically, the surface layer is pale brown silty clay loam after mixing and about 7 inches thick. The subsoil is yellowish brown and light yellowish brown clay and clay loam about 6 inches thick. The substratum consists of very pale brown silt loam about 4 inches thick; a white hardpan about 16 inches thick; and, to a depth of 60 inches or more, very pale brown sandy loam. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Ridenbaugh soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow or very slow, and the hazard of erosion is slight.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by mixed alluvium. Areas are subrounded and are 10 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick; a white hardpan about 8 inches thick; and, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from about 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is ponded to very slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Ridenbaugh soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings should be made late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush and sparse bluebunch wheatgrass along the margins of slick spots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excess sodium.

The depth of the root zone, low available water capacity of the Ridenbaugh soil, and moderately fine and fine texture of the surface layer and subsoil are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. The texture limits the yield and quality of potatoes, sugar beets, and other root crops, and impedes harvesting. Proper crop selection and irrigation water management are needed to offset these limitations.

The use of the soils in this complex as sites for residential development is limited by low strength, shrink-swell potential, cemented pan, and when excavations extend below the hardpan, unstable cutbanks.

This complex is in capability subclass IVs, irrigated, and VIIs, nonirrigated.

156-Ridenbaugh-Sebree silty clay loams, 2 to 4 percent slopes. The soils in this complex are on old alluvial plains and alluvial terraces. The elevation is 2,800 to 3,200 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

About 75 percent of the complex is Ridenbaugh silty clay loam, 2 to 4 percent slopes, and 20 percent is Sebree silty clay loam, 2 to 4 percent slopes. The rest is Chilcott silt loam, 2 to 4 percent slopes, and Kunaton silty clay loam, 2 to 4 percent slopes.

The Ridenbaugh soil is shallow to a hardpan, and it is well drained. It formed mainly in loess or silty alluvium. Typically, the surface layer is pale brown silty clay loam after mixing and about 7 inches thick. The subsoil is

yellowish brown and light yellowish brown clay and clay loam about 6 inches thick. The substratum consists of very pale brown silt loam about 4 inches thick; a white hardpan about 16 inches thick; and, to a depth of 60 inches or more, very pale brown sandy loam. Depth to the hardpan ranges from 10 to 20 inches.

Permeability of the Ridenbaugh soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

The Sebree soil is moderately deep to a hardpan, well drained, and sodium affected. It formed in loess or silty alluvium that is underlain by mixed alluvium. Areas are subrounded and 1 to 60 feet across. Typically, where the soil material to a depth of 7 inches is mixed, the surface layer is brown silty clay loam. The subsoil is light yellowish brown silty clay loam about 23 inches thick. The substratum consists of very pale brown loam about 4 inches thick; a white hardpan about 8 inches thick; and, to a depth of 60 inches or more, variegated sand and gravel. Depth to the hardpan ranges from about 20 to 40 inches.

Permeability of the Sebree soil is slow above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community on the Ridenbaugh soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Ridenbaugh soil is best suited to grazing in spring and fall. If the range is in poor condition, it can be reseeded to crested wheatgrass, Siberian wheatgrass, or other suitable grasses. Seedings should be made late in fall. In some years the available moisture is inadequate, and there is a moderate chance of seeding failure. Late in summer and early in fall the low available water capacity limits plant growth.

The potential natural plant community on the Sebree soil is dominated by stunted big sagebrush and sparse bluebunch wheatgrass along the margins of slick spots. This soil has very limited potential for producing forage under natural conditions because of the low moisture intake and excess sodium.

The depth of the root zone, the available water capacity of the Ridenbaugh soil, and the moderately fine and fine texture of the surface layer and subsoil are the major limitations to agriculture. The hardpan hinders the

growth of some deep-rooted crops. It also limits the available water capacity of the soil. The texture limits the yield and quality of potatoes, sugar beets, and other root crops and impedes harvesting.

The use of these soils for residential development is limited by low strength, shrink-swell potential, hardpan, and, if excavations extend below the hardpan, unstable cutbanks.

This complex is in capability subclass IVe, irrigated, and VIs, nonirrigated.

157-Riverwash. Riverwash consists of unstabilized sandy, silty, clayey, or gravelly sediments that are flooded and washed and reworked by rivers so frequently that they support little or no vegetation.

Riverwash often occurs as islands and beaches on the Boise and Snake rivers. The material is stratified because of annual deposition and because it is reworked by water.

The vegetation consists of willows, rushes, sedges, and some water-loving grasses. Riverwash is not suitable for use as rangeland or wildlife habitat.

This miscellaneous area is in capability class VIII.

158-Rock outcrop-Trevino complex, 5 to 20 percent slopes. This complex is on basalt plains. The elevation is 2,500 to 3,300 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 40 percent of the complex is Rock outcrop, and 30 percent is Trevino extremely stony silt loam. The rest consists of soils that are similar to Chilcott silt loam, bedrock substratum, 0 to 8 percent slopes, and of McCain silt loam, 0 to 8 percent slopes; Potratz silt loam, 0 to 8 percent slopes; Scism silt loam, bedrock substratum, 0 to 8 percent slopes; Sebree silty clay loam, 0 to 8 percent slopes; Trio very fine sandy loam, 0 to 8 percent slopes; Truesdale fine sandy loam, bedrock substratum, 0 to 4 percent slopes.

Rock outcrop consists of areas where the basalt is exposed. The outcrops are ridges and mounds ranging from a few feet to 20 feet in height. There are cracks on the crest of the ridges and mounds.

The Trevino soil is shallow and well drained. It formed in loess that is underlain by bedrock. Typically, the surface layer is light brownish gray extremely stony silt loam about 4 inches thick. The subsoil is pale brown stony silt loam about 6 inches thick. The substratum is very pale brown and white silt loam and loam about 9 inches thick. It is underlain by basalt. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Trevino soil is moderate. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

Areas of this complex are used primarily as rangeland and wildlife habitat.

The potential natural vegetation is dominated by bluebunch wheatgrass and stunted big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

The Trevino soil is best suited to grazing in winter. It has low potential for forage production and is not suited to seeding by conventional methods because of the stones.

This complex is in capability subclass VIIs, nonirrigated.

159-Rubble land. Rubble land consists of areas of stones and boulders that are free from vegetation except for lichens. The areas are commonly at the base of side slopes in the Snake River canyon. Some areas include cobbles and are in drainageways.

This miscellaneous area is in capability subclass VIIIs.

160-Scism silt loam, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick, a weakly cemented hardpan about 7 inches thick, and to a depth of 60 inches or more, light yellowish brown silt loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 0 to 2 percent slopes; Potratz silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; Purdam silt loam, 0 to 2 percent slopes; Rock outcrop; Shabliss very fine sandy loam, 0 to 2 percent slopes; Trevino extremely stony silt loam, 5 to 20 percent slopes; Truesdale fine sandy loam, 0 to 2 percent slopes; and Turbyfill fine sandy loam, 0 to 2 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability of this Scism soil is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of deep-rooted crops. It also limits the available water capacity of the soil. The hardpan is weakly cemented and can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The use of this soil for residential development is limited by the depth to the hardpan, low strength, and frost action potential.

This map unit is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

161-Scism silt loam, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick, a weakly cemented hardpan about 7 inches thick, and, to a depth of 60 inches or more, light yellowish brown silt loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 2 to 4 percent slopes; Potratz silt loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; Purdam silt loam, 2 to 4 percent slopes; Rock outcrop; Shabliss very fine sandy loam, 2 to 4 percent slopes; Trevino extremely stony silt loam, 5 to 20 percent slopes; Truesdale fine sandy loam, 2 to 4 percent slopes; and Turbyfill fine sandy loam, 2 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders

the growth of deep-rooted crops. It also limits the available water capacity of the soil. The hardpan is weakly cemented and can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The use of this soil for residential development is limited by the moderate depth to the hardpan, low strength, and frost action potential.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

162-Scism silt loam, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick, a weakly cemented hardpan about 7 inches thick, and, to a depth of 60 inches or more, light yellowish brown silt loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Garbutt silt loam, 4 to 8 percent slopes; Potratz silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; Purdam silt loam, 4 to 8 percent slopes; Rock outcrop; Trevino extremely stony silt loam, 4 to 8 percent slopes; Truesdale fine sandy loam, 4 to 8 percent slopes; and soils that are similar to this Scism soil but have slopes of 8 to 20 percent. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to farming. The weakly cemented hardpan hinders the growth of deep-rooted crops.

The use of this soil for residential development is limited by the moderate depth to the hardpan, low strength, and frost action potential.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

163-Scism silt loam, bedrock substratum, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick, and, below that, a pale brown, weakly cemented hardpan about 10 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of McCain silt loam, 0 to 2 percent slopes; Potratz silt loam, 0 to 2 percent slopes; Power silt loam, 0 to 2 percent slopes; Rock outcrop; Trevino extremely stony silt loam, 5 to 20 percent slopes; Trio very fine sandy loam, 0 to 2 percent slopes; Truesdale fine sandy loam, bedrock substratum, 0 to 2 percent slopes; and Turbyfill fine sandy loam, 0 to 2 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset this limitation.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the moderate depth to the hardpan, underlying bedrock, low strength, and frost action potential.

This map unit is in capability subclass IIs, irrigated, and VIc, nonirrigated.

164-Scism silt loam, bedrock substratum, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick and, below that, a pale brown, weakly cemented hardpan about 10 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of McCain silt loam, 2 to 4 percent slopes; Potratz silt loam, 2 to 4 percent slopes; Power silt loam, 2 to 4 percent slopes; Rock outcrop; Trevino extremely stony silt loam, 5 to 20 percent slopes; Trio very fine sandy loam, 2 to 4 percent slopes; Truesdale fine sandy loam, bedrock substratum, 2 to 4 percent slopes; and Turbyfill fine sandy loam, 2 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. Sweet corn, barley, oats, mint, and potatoes are also grown. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shads-

cale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also restricts the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the moderate depth to the hardpan and the underlying bedrock, low strength, and frost action potential.

This map unit is in capability subclass IIe, irrigated, and VIc, nonirrigated.

165-Scism silt loam, bedrock substratum, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick and, below that, a pale brown, weakly cemented hardpan about 10 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of McCain silt loam, 4 to 8 percent slopes; Potratz silt loam, 4 to 8 percent slopes; Power silt loam, 4 to 8 percent slopes; Rock outcrop; Trevino extremely stony silt loam, 5 to 20 percent slopes; and Trio very fine sandy loam, 4 to 8 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the moderate depth to the hardpan and the underlying bedrock, low strength, and frost action potential.

This map unit is in capability subclass IIIe, irrigated, and VIe, nonirrigated.

166-Scism silt loam, bedrock substratum, 8 to 12 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in loess or silty alluvium on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is brown silt loam about 4 inches thick. The underlying material consists of very pale brown silt loam about 28 inches thick and, below that, a pale brown, weakly cemented hardpan about 10 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of McCain silt loam, 8 to 12 percent slopes; Power silt loam, 8 to 12 percent slopes; Rock outcrop; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shads-

cale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The slope, hazard of erosion, and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Sprinkling is the most suitable method of irrigating crops on this soil.

The use of this soil for residential development is limited by slope, depth to the hardpan and the underlying bedrock, low strength, and frost action potential.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

167-Searles-Ladd complex, 4 to 15 percent slopes.

The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,200 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 45 percent of the complex is Searles gravelly loam, and 40 percent is Ladd loam. The rest is Rainey coarse sandy loam, 15 to 30 percent slopes; Rock outcrop; and a soil that is similar to Searles fine gravelly loam, 4 to 15 percent slopes, but is underlain by bedrock at a depth of less than 20 inches.

The Searles soil is moderately deep and well drained. It formed in colluvium and material that weathered from granite. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Granite underlies the subsoil. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is medium or rapid, and the hazard of erosion is moderate to high.

The Ladd soil is very deep and well drained. It formed mainly in weathered granitic colluvium. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium or rapid, and the hazard of erosion is moderate or high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, and alfalfa. Seedings are most successful late in fall or early in spring.

The use of the Searles soil as sites for residential development is limited by the slope, depth to rock, inaccessibility, shrink-swell potential, and frost action potential. Moderately slow permeability, shrink-swell potential, low strength, slope, and frost action potential are limitations to this use on the Ladd soil.

This complex is in capability subclass IVe, nonirrigated.

168-Searles-Ladd complex, 15 to 30 percent slopes.

The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,200 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 45 percent of the complex is Searles gravelly loam, and 40 percent is Ladd loam. The rest is Rainey coarse sandy loam, 15 to 30 percent slopes; Rock outcrop; and a soil that is similar to Searles fine gravelly loam, 15 to 30 percent slopes, but is underlain by bedrock at a depth of less than 20 inches.

The Searles soil is moderately deep and well drained. It formed in colluvium and material that weathered from rhyolite. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Granite underlies the subsoil. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The Ladd soil is very deep and well drained. It formed mainly in weathered granite and colluvium. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is rapid or very rapid, and the hazard of erosion is high or very high.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for residential and urban development.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush.

If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

These soils are suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, and alfalfa. Seedings are most successful late in fall or early in spring.

The use of the Searles soil for residential development is limited by the slope, depth to rock, inaccessibility, shrink-swell potential, and frost action potential. Moderately slow permeability, shrink-swell potential, low strength, slope, and frost action potential are limitations to this use on the Ladd soil.

This complex is in capability subclass VIe, nonirrigated.

169-Searles-Ladd complex, 30 to 65 percent slopes. The soils in this complex are on mountains and colluvial mountain foot slopes. The elevation is 3,200 to 5,000 feet. The average annual precipitation is 15 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 45 percent of the complex is Searles gravelly loam, and 40 percent is Ladd loam. The rest is Rainey coarse sandy loam, 30 to 65 percent slopes; Rock outcrop; and a soil that is similar to Searles fine gravelly loam, 30 to 60 percent slopes, but is underlain by bedrock at a depth of less than 20 inches.

The Searles soil is moderately deep and well drained. It formed in colluvium and material that weathered from acid igneous rock. Typically, the surface layer is grayish brown gravelly loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Granite underlies the subsoil. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Searles soil is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

The Ladd soil is very deep and well drained. It formed mainly in weathered granite and colluvium. Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil is light yellowish brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown sandy clay loam to a depth of 60 inches or more.

Permeability is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and

Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

170-Searles-Rock outcrop complex, 15 to 30 percent slopes. This complex is on mountains. The elevation is 3,000 to 4,000 feet. The average annual precipitation is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 55 percent of the complex is Searles stony loam, 15 to 30 percent slopes, and 15 percent is Rock outcrop. The rest is Ada gravelly sandy loam, 15 to 30 percent slopes; Ladd loam, 15 to 30 percent slopes; and Ola loam, 15 to 30 percent slopes.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from acid igneous rock. Typically, the surface layer is grayish brown stony loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Granite underlies the subsoil. Depth to the bedrock is 20 to 40 inches.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is rapid, and the hazard of erosion is high.

The Rock outcrop is exposed bedrock, which consists primarily of granodiorite and quartz monzonite.

Areas of this complex are used primarily as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

The soil is best suited to grazing in fall and spring and early in summer. If the range is in poor condition, it can be reseeded to pubescent wheatgrass, intermediate wheatgrass, alfalfa, and other suitable plants. Seedings are most successful late in fall or early in spring.

Construction sites that are left without adequate plant cover during periods of high precipitation are subject to accelerated erosion. The use of sediment entrapment basins and other measures to prevent runoff can reduce sediment yield from sites that are left unprotected over the winter. Reestablishing vegetation on cut and fill slopes can be difficult unless the topsoil is stockpiled and redistributed before planting.

This complex is in capability subclass VIe, nonirrigated.

171-Searles-Rock outcrop complex, 30 to 80 percent slopes. This complex is on mountains. The elevation is 3,000 to 4,000 feet. The average annual precipita-

tion is 14 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 140 days.

About 55 percent of the complex is Searles stony loam, 30 to 80 percent slopes, and 15 percent is Rock outcrop. The rest is Ada gravelly sandy loam, 30 to 60 percent slopes; Ladd loam, 30 to 80 percent slopes; and Ola loam, 30 to 80 percent slopes.

The Searles soil is moderately deep and well drained. It formed mainly in material that weathered from acid igneous rock. Typically, the surface layer is grayish brown stony loam about 9 inches thick. The subsoil in the upper 5 inches is pale brown fine gravelly coarse sandy clay loam; below that, it is very gravelly coarse sandy clay loam about 16 inches thick. Granite underlies the subsoil. Depth to the bedrock is 20 to 40 inches.

Permeability is moderately slow. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is very rapid, and the hazard of erosion is very high.

The Rock outcrop is exposed bedrock, which consists primarily of granodiorite and quartz monzonite.

Areas of this complex are used primarily as rangeland and wildlife habitat.

The potential natural plant community is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

The soil is best suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

172-Shabliss very fine sandy loam, 0 to 2 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in wind-reworked alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown very fine sandy loam and silt loam about 5 inches thick. The subsoil is yellowish brown and pale brown silt loam about 8 inches thick. The substratum consists of pale brown loam about 4 inches thick, a very pale brown weakly cemented hardpan about 10 inches thick, and, to a depth of 60 inches or more, light yellowish brown fine sandy loam.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 0 to 2 percent slopes; Truesdale fine sandy loam, 0 to 2 percent slopes; and Turbyfill fine sandy loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through the hardpan. The root zone extends to a

depth of 10 to 20 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. There is a high chance of seeding failure.

The shallowness of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation. Sprinkling is the irrigation system most commonly used on this soil. The weakly cemented hardpan can be ripped by heavy equipment.

The use of this soil for residential development is limited by the shallowness to the hardpan, low strength, and frost action potential.

This map unit is in capability subclass IVs, irrigated, and VIs, nonirrigated.

173-Shabliss very fine sandy loam, 2 to 4 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in wind-reworked alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown very fine sandy loam and silt loam about 5 inches thick. The subsoil is yellowish brown and pale brown silt loam about 8 inches thick. The substratum consists of pale brown loam about 4 inches thick, a very pale brown, weakly cemented hardpan about 10 inches thick, and, to a depth of 60 inches or more, light yellowish brown fine sandy loam. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 2 to 4 percent slopes; Truesdale fine sandy loam, 2 to 4 percent slopes; and Turbyfill fine sandy loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability of this Shabliss soil is moderate above the hardpan and very slow through the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and rooting depth are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation. Sprinkling is the irrigation system most commonly used on this soil. The weakly cemented hardpan can be ripped by heavy equipment.

The use of this soil for residential development is limited by the depth to the hardpan, low strength, and frost action potential.

This map unit is in capability subclass IVe, irrigated, and VIs, nonirrigated.

174-Tenmile very gravelly loam, 0 to 4 percent slopes. This soil is very deep and well drained. It formed in coarse, granitic alluvium on dissected alluvial plains. The elevation is 2,700 to 4,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Included in mapping are small areas of Chilcott silt loam, 0 to 4 percent slopes, and a soil that is similar to Chilcott silt loam, 0 to 4 percent slopes, but has a gravelly loam or loam surface texture. These soils make up about 10 percent of this map unit.

Permeability of this Tenmile soil is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the erosion hazard is slight.

This soil is used mainly as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing early in spring and in fall.

The gravelly textures and slow permeability are the major limitations to farming.

The use of this soil for residential development is limited mainly by the slow permeability and shrink-swell potential.

The slow permeability limits this soil for use as septic tank absorption fields. This limitation can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential limits this soil for use as sites for houses. Suitable backfill material can minimize the stress on foundations and basement walls that is caused by the shrinking and swelling.

The shrink-swell potential limits the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset this limitation.

This map unit is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

175-Tenmile very gravelly loam, 4 to 12 percent slopes. This soil is very deep and well drained. It formed in coarse, granitic alluvium on dissected alluvial plains. The elevation is 2,700 to 4,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

In some areas of this map unit, patterned ground occurs. The patterned ground form consists of subrounded mounds that are 10 to 30 feet across and 1 to 5 feet high and of nearly level to concave areas between the mounds.

Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Included in mapping are small areas of Brent sandy loam, low rainfall, 4 to 12 percent slopes, and Chilcott silt loam, 4 to 8 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the erosion hazard is moderate.

This soil is used mainly as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing early in spring and in fall.

The hazard of erosion, slow permeability, and gravelly texture are the major limitations to farming.

The use of this soil for residential development is limited by the slope, slow permeability, and shrink-swell potential.

The slow permeability limits this soil for use as septic tank absorption fields. This limitation can be offset by increasing the size of the absorption field. Mound-type absorption fields can be used if space is limited.

The shrink-swell potential limits this soil for use as sites for houses. Suitable backfill material can minimize the stress on foundations and basement walls that is caused by the shrinking and swelling.

The shrink-swell potential limits the construction of roads, driveways, and other paved surfaces. Suitable subgrade material can help offset this limitation.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

176-Tenmile very gravelly loam, 12 to 30 percent slopes. This soil is very deep and well drained. It formed in coarse, granitic alluvium on dissected alluvial plains. The elevation is 2,700 to 4,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Included in mapping are small areas of Chilcott silt loam, 4 to 8 percent slopes; Brent sandy loam, low rainfall, 4 to 12 percent slopes; a soil that is similar to Brent sandy loam low rainfall, 12 to 30 percent slopes, but is 5 to 10 percent fine gravel throughout; and a soil that is similar to Chilcott silt loam, 4 to 8 percent slopes, but has a very gravelly loam and very gravelly sandy loam surface layer and is very gravelly throughout. These soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is rapid or very rapid, and the erosion hazard is high or very high.

This soil is used mainly as rangeland and wildlife habitat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing early in spring and in fall. Range seeding is limited by droughtiness and the difficulty of preparing a seedbed in the very gravelly topsoil.

This map unit is in capability subclass VIe, nonirrigated.

177-Tenmile very gravelly loam, 30 to 65 percent slopes. This soil is very deep and well drained. It formed in coarse, granitic alluvium on dissected alluvial plains. The elevation is 2,700 to 4,500 feet. The average annual precipitation is 12 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is pale brown very gravelly loam about 10 inches thick. The subsoil is light yellowish brown very gravelly clay loam and very gravelly sandy clay about 27 inches thick. The substratum in the upper 12 inches is brownish yellow very gravelly sandy clay loam; below that, to a depth of 60 inches or more, it is variegated very gravelly loamy coarse sand.

Included in mapping are small areas of Brent sandy loam, low rainfall, 4 to 12 percent slopes; Lankbush sandy loam, 30 to 65 percent slopes; and Tenmile very gravelly loam, 0 to 4 percent slopes. These soils make up about 15 percent of this map unit.

Permeability is slow. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the erosion hazard is very high.

This soil is used mainly as rangeland and wildlife habitat.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and antelope bitterbrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing early in spring and in fall. Range seeding is limited by the slope, droughtiness, and difficulty of preparing a seedbed in the very gravelly topsoil.

This map unit is in capability subclass VIIe, nonirrigated.

178-Tindahay fine sandy loam, 0 to 2 percent slopes. This soil is very deep and somewhat excessively drained. It formed in acid igneous alluvium on alluvial fans and low alluvial terraces adjacent to intermittent drainageways. The elevation is 2,500 to 3,300 feet. The

average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is light brownish gray fine sandy loam about 8 inches thick. The underlying material consists of light brownish gray and pale brown fine sandy loam and sandy loam about 15 inches thick and below that, to a depth of 60 inches or more, light gray and variegated loamy coarse sand and fine gravelly loamy coarse sand.

Included in mapping are small areas of Jenness fine sandy loam, 0 to 2 percent slopes, and Quincy sand, 2 to 8 percent slopes. These included soils make up about 10 percent of the map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This soil is suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, Indian ricegrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The moderately rapid permeability is the major limitation to farming. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aids seedling emergence and water penetration.

The use of this soil for residential development is limited mainly by unstable cutbanks and a hazard of seepage.

Septic tank absorption fields can work well in this soil. If effluent is discharged into the coarse textured underlying material, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by unstable cutbanks. Cutbanks could collapse if excavations extend into the coarse textured alluvium.

This soil is well suited to use as sites for houses with and without basements. Lawns and gardens can grow better if finer textured material is added as topsoil.

This map unit is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

179-Tindahay fine sandy loam, 2 to 4 percent slopes. This soil is very deep and somewhat excessively drained. It formed in acid igneous alluvium on alluvial fans and low alluvial terraces adjacent to intermittent drainageways. The elevation is 2,500 to 3,300 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is light brownish gray fine sandy loam about 8 inches thick. The underlying material consists of light brownish gray and pale brown fine sandy loam and sandy loam about 15 inches thick and below that, to a depth of 60 inches or more, light gray and variegated loamy coarse sand and fine gravelly loamy coarse sand.

Included in mapping are small areas of Jenness fine sandy loam, 2 to 4 percent slopes, and Quincy sand, 2 to 8 percent slopes. These soils make up about 10 percent of the map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This soil is suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, Indian ricegrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The hazard of erosion and moderately rapid permeability are the major limitations to farming. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

The use of this soil for residential development is limited mainly by unstable cutbanks and seepage.

Septic tank absorption fields can work well in this soil. If effluent is discharged into the coarse textured underlying material, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by unstable cutbanks. Cutbanks could collapse if excavations extend into the coarse textured alluvium.

This soil is well suited to use as sites for houses with and without basements. Lawns and gardens can grow better if finer textured material is added as topsoil.

This map unit is in capability subclass IIIe, irrigated, and VIc, nonirrigated.

180-Tindahay fine sandy loam, 4 to 8 percent slopes. This soil is very deep and somewhat excessively drained. It formed in acid igneous alluvium on alluvial fans and low alluvial terraces adjacent to intermittent drainageways. The elevation is 2,500 to 3,300 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is light brownish gray fine sandy loam about 8 inches thick. The underlying material consists of light brownish gray and pale brown fine sandy loam and sandy loam about 15 inches thick and below that, to a depth of 60 inches or more, light gray and variegated loamy coarse sand and fine gravelly loamy coarse sand.

Included in mapping are small areas of Jenness fine sandy loam, 4 to 8 percent slopes, and Quincy sand, 4 to 8 percent slopes. These soils make up about 10 percent of the map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This soil is suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, Indian ricegrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The hazard of erosion and moderately rapid permeability are the major limitations to farming. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

The use of this soil for residential development is limited mainly by unstable cutbanks and seepage.

Septic tank absorption fields can work well in this soil. If effluent is discharged into the coarse textured underlying material, contamination of nearby water supplies is a hazard.

Digging and trenching are hampered by unstable cutbanks. Cutbanks could collapse if excavations extend into the coarse textured alluvium.

This soil is well suited to use as sites for houses with and without basements. Lawns and gardens will grow better if finer textured material is added as top soil.

This map unit is in capability subclass IVe, irrigated, and VIc, nonirrigated.

181-Tindahay gravelly loam, 8 to 12 percent slopes. This soil is very deep and somewhat excessively drained. It formed in acid igneous alluvium on alluvial fans and low alluvial terraces adjacent to intermittent drainageways. The elevation is 2,500 to 3,300 feet. The average annual precipitation is 12 inches, the average annual temperature is 50 degrees F, and the frost-free period is about 145 days.

Typically, the surface layer is light brownish gray gravelly loam about 8 inches thick. The underlying material consists of light brownish gray and pale brown fine sandy loam and sandy loam about 15 inches thick and below that, to a depth of 60 inches or more, light gray and variegated loamy coarse sand and fine gravelly loamy coarse sand.

Included in mapping are small areas of Jenness fine sandy loam, 2 to 4 percent slopes; Quincy sand, 2 to 8 percent slopes; and a soil that is similar to this Tindahay soil but is more than 35 percent gravel in the profile and has slopes of 8 to 30 percent. The included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, the bluebunch wheatgrass and Thurber needlegrass are gradually replaced by red threeawn and cheatgrass. Big sagebrush increases.

This soil is suited to grazing in spring and late in fall. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, Indian ricegrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding

failure. This soil is highly erodible if vegetation is removed; therefore, grazing management is essential.

The hazard of erosion and moderately rapid permeability are the major limitations to farming. Returning crop residue to the soil and turning under green manure crops help to maintain or increase the content of organic matter. Applying gypsum and other soil amendments can improve the structure of the soil and thus aid seedling emergence and water penetration.

The use of this soil for residential development is limited mainly by unstable cutbanks, slope, and seepage.

Slope limits this soil for use as septic tank absorption fields. Structures such as terraces and diversions are effective in offsetting this limitation. If effluent is discharged into the underlying material, contamination of nearby water supplies is a hazard.

This soil is well suited to use as sites for houses with and without basements. Lawns and gardens will grow better if finer textured soil material is added as topsoil.

Cutbanks can collapse if excavations extend into the coarse-textured alluvium.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

182-Trevino-Potratz complex, 0 to 4 percent slopes. The soils in this complex formed in loess on basalt plains. The elevation is 2,600 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

About 50 percent of the complex is Trevino extremely stony silt loam, and 30 percent is Potratz silt loam. The rest is Minidoka silt loam, bedrock substratum, 2 to 4 percent slopes; Scism silt loam, bedrock substratum, 0 to 4 percent slopes; Trio very fine sandy loam, 0 to 4 percent slopes; and Truesdale fine sandy loam, bedrock substratum, 0 to 4 percent slopes.

The Trevino soil is shallow and well drained. Typically, the surface layer is light brownish gray extremely stony silt loam about 4 inches thick. The subsoil is pale brown stony silt loam about 6 inches thick. The substratum is very pale brown and white silt loam and loam about 9 inches thick. It is underlain by highly fractured basalt. Depth to the bedrock ranges from 10 to 20 inches.

Permeability of this Trevino soil is moderate. The root zone extends to a depth of 10 to 20 inches. The available water capacity is low. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

The Potratz soil is moderately deep and well drained. Typically, the surface layer is light brownish gray and pale brown silt loam about 10 inches thick. The subsoil is yellowish brown and brown silt loam about 9 inches thick. The substratum is light gray and white loam and silt loam about 19 inches thick. It is underlain by basalt. Depth to bedrock ranges from 20 to 40 inches.

Permeability of this Potratz soil is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is high. Runoff is medium, and the hazard of erosion is slight to moderate.

The soils in this complex are used mainly as rangeland and wildlife habitat. In some areas, they are used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, these soils are used for residential and urban development.

The potential natural plant community is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The bedrock hinders the growth of deep-rooted crops.

The use of these soils for residential development is limited mainly by the depth to rock and by frost action potential.

This complex is in capability subclass IVe, irrigated, and VIs, nonirrigated.

183-Trio very fine sandy loam, 0 to 2 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in wind-reworked alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown very fine sandy loam about 9 inches thick. The subsoil is pale brown very fine sandy loam about 5 inches thick. The substratum consists of a light gray, weakly cemented hardpan about 12 inches thick and, below that, very pale brown very fine sandy loam about 7 inches thick. Basalt underlies the substratum. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Rock outcrop; Scism silt loam, bedrock substratum, 0 to 2 percent slopes; Trevino extremely stony silt loam, 0 to 4 percent slopes; and Truesdale fine sandy loam, bedrock substratum, 0 to 2 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is very low. Runoff is very slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of deep-rooted crops and limits the available water capacity of this soil.

The use of this soil for residential development is limited by the depth to the hardpan and the underlying bedrock and by low strength.

This map unit is in capability subclass IVs, irrigated, and VIs, nonirrigated.

184-Trio very fine sandy loam, 2 to 4 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in wind-reworked alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown very fine sandy loam about 9 inches thick. The subsoil is pale brown very fine sandy loam about 5 inches thick. The substratum consists of a light gray, weakly cemented hardpan about 12 inches thick over very pale brown very fine sandy loam about 7 inches thick. It is underlain by basalt. Depth to the hardpan ranges from 10 to 20 inches.

Included in mapping are small areas of Rock outcrop; Scism silt loam, bedrock substratum, 2 to 4 percent slopes; Trevino extremely stony silt loam, 0 to 4 percent slopes; and Truesdale fine sandy loam, bedrock substratum, 2 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is very low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of deep-rooted crops and limits the available water capacity of the soil.

The use of this soil for residential development is limited by the depth to the hardpan and the underlying bedrock and by low strength.

This map unit is in capability subclass IVe, irrigated, and VIs, nonirrigated.

185-Trio very fine sandy loam, 4 to 8 percent slopes. This soil is shallow to a hardpan, and it is well drained. It formed in wind-reworked alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown very fine sandy loam about 9 inches thick. The subsoil is pale brown very fine sandy loam about 5 inches thick. The substratum consists of a light gray, weakly cemented hardpan about 12 inches thick over very pale brown very fine sandy loam about 7 inches thick. It is underlain by basalt. Depth to the hardpan is 10 to 20 inches.

Included in mapping are small areas of Rock outcrop; Scism silt loam, bedrock substratum, 4 to 8 percent slopes; Trevino extremely stony silt loam, 4 to 15 percent slopes; and Truesdale fine sandy loam, bedrock substratum, 4 to 8 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderate above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 10 to 20 inches. The available water capacity is very low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, bluebunch wheatgrass, and big sagebrush. If the range deteriorates, Thurber needlegrass and bluebunch wheatgrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of deep-rooted crops and limits the available water capacity of the soil.

The use of this soil for residential development is limited by the depth to the hardpan and the underlying bedrock and by low strength.

This map unit is in capability subclass IVe, irrigated, and Vle, nonirrigated.

186-Truesdale fine sandy loam, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick, a very pale brown, weakly cemented hardpan about 9 inches thick, and below that, to a depth of 60 inches or more, very pale brown fine sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 0 to 2 percent slopes; Shabliss very fine sandy loam, 0 to 2 percent slopes; and Turbyfill fine sandy loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation.

The weakly cemented hardpan can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to the hardpan and by the frost action potential.

This map unit is in capability subclass II_s, irrigated, and VI_c, nonirrigated.

187-Truesdale fine sandy loam, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick, a very pale brown, weakly cemented hardpan about 9 inches thick, and, to a depth of 60 inches or more, very pale brown fine sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 2 to 4 percent slopes; Shabliss very fine sandy loam, 2 to 4 percent slopes; and Turbyfill fine sandy loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders

the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation. The weakly cemented hardpan can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to the hardpan and by the frost action potential.

This map unit is in capability subclass II_e, irrigated, and VI_c, nonirrigated.

188-Truesdale fine sandy loam, 4 to 8 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick, a very pale brown, weakly cemented hardpan about 9 inches thick, and, to a depth of 60 inches or more, very pale brown fine sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 3 to 12 percent slopes; Scism silt loam, 4 to 8 percent slopes; Turbyfill fine sandy loam, 4 to 8 percent slopes; and a soil that is similar to Shabliss very fine sandy loam but has slopes of 4 to 8 percent. These included soils make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years

the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation. The weakly cemented hardpan can be ripped by heavy equipment.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to the hardpan and by the frost action potential.

This map unit is in capability subclass IIle, irrigated, and VIe, nonirrigated.

189-Truesdale fine sandy loam, 8 to 12 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick, a very pale brown, weakly cemented hardpan about 9 inches thick, and, to a depth of 60 inches or more, very pale brown fine sandy loam. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 3 to 12 percent slopes; Scism silt loam, 8 to 12 percent slopes; a soil that is similar to Shabliss very fine sandy loam but has slopes of 8 to 12 percent; and Turbyfill fine sandy loam, 8 to 12 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation. The weakly cemented hardpan can be ripped by heavy equipment. Sprinkling is the most suitable method of irrigating crops on this soil.

The use of this soil for residential development is limited by the depth to the hardpan and by the frost action potential.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated.

190-Truesdale fine sandy loam, bedrock substratum, 0 to 2 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick over a very pale brown, weakly cemented hardpan about 17 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Potratz silt loam, 0 to 2 percent slopes; Rock outcrop; Scism silt loam, bedrock substratum, 0 to 2 percent slopes; and Trevino extremely stony silt loam, 0 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheat-

grass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The depth of the root zone is the major limitation to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of this soil. Proper crop selection and irrigation water management are needed to offset this limitation.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to the hardpan and by the frost action potential.

This map unit is in capability subclass II_s, irrigated, and VI_c, nonirrigated.

191-Truesdale fine sandy loam, bedrock substratum, 2 to 4 percent slopes. This soil is moderately deep to a hardpan, and it is well drained. It formed in wind-reworked alluvium and loess on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 8 inches, the average annual temperature is 52 degrees F, and the frost-free period is about 150 days.

Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown fine sandy loam about 8 inches thick. The substratum consists of pale brown fine sandy loam about 14 inches thick over a very pale brown, weakly cemented hardpan about 17 inches thick. Basalt underlies the pan. Depth to the hardpan ranges from 20 to 40 inches.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Potratz silt loam, 2 to 4 percent slopes; Rock outcrop; Scism silt loam, bedrock substratum, 2 to 4 percent slopes; and Trevino extremely stony silt loam, 2 to 4 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability of this Truesdale soil is moderately rapid above the hardpan and very slow through fractures in the hardpan. The root zone extends to a depth of 20 to 40 inches. The available water capacity is low. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheat

grass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion and depth of the root zone are the major limitations to agriculture. The hardpan hinders the growth of some deep-rooted crops. It also limits the available water capacity of the soil. Proper crop selection and irrigation water management are needed to offset these limitations.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by the depth to the hardpan and the underlying bedrock and by the frost action potential.

This map unit is in capability subclass II_e, irrigated, and VI_c, nonirrigated.

192-Turbyfill fine sandy loam, 0 to 2 percent slopes. This soil is very deep and well drained. It formed in eolian material or moderately coarse textured alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 53 degrees F, and the frost-free period is about 150 days.

Typically the surface layer is pale brown fine sandy loam about 3 inches thick. The substratum is pale brown and very pale brown fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 0 to 2 percent slopes; Shabliss very fine sandy loam, 0 to 2 percent slopes; and Truesdale fine sandy loam, 0 to 2 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is slow, and the hazard of erosion is slight.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay. In some areas, this soil is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedlings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

This soil has no major limitations to farming.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by a hazard of frost action in the soil.

This map unit is in capability class I, irrigated, and subclass VIc, nonirrigated.

193-Turbyfill fine sandy loam, 2 to 4 percent slopes. This soil is very deep and well drained. It formed in eolian material or moderately coarse textured alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 53 degrees F, and the frost-free period is about 150 days.

Typically the surface layer is pale brown fine sandy loam about 3 inches thick. The substratum is pale brown and very pale brown fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Feltham loamy sand, 0 to 3 percent slopes; Scism silt loam, 2 to 4 percent slopes; Shabliss very fine sandy loam, 2 to 4 percent slopes; and Truesdale fine sandy loam, 2 to 4 percent slopes. These included soils make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is medium, and the hazard of erosion is moderate.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for irrigated crops and pasture. The major crops are field corn, corn silage, sugar beets, wheat, and alfalfa hay.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The hazard of erosion is the major limitation to farming. Proper crop selection and irrigation water management are needed to overcome this limitation.

Furrow, border, corrugation, and sprinkler irrigation systems can be used on this soil. The border and corrugation systems are well suited to alfalfa, small grains, and pasture. Furrow irrigation is well suited to row crops. Sprinkler irrigation is well suited to most crops.

The use of this soil for residential development is limited by a hazard of frost action in the soil.

194-Turbyfill fine sandy loam, 20 to 35 percent slopes. This soil is very deep and well drained. It formed in eolian material or moderately coarse textured alluvium on basalt plains. The elevation is 2,700 to 3,100 feet. The average annual precipitation is 9 inches, the average annual temperature is 53 degrees F, and the frost-free period is about 150 days.

Typically the surface layer is pale brown fine sandy loam about 3 inches thick. The substratum is pale brown and very pale brown fine sandy loam to a depth of 60 inches or more.

Included in mapping are small areas of Rock outcrop; Rubble land; and Trevino extremely stony silt loam, 5 to 20 percent slopes. These inclusions make up about 15 percent of this map unit.

Permeability is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

In most areas, this soil is used as rangeland and wildlife habitat. In some areas, it is used for residential and urban development.

The potential natural plant community on this soil is dominated by Thurber needlegrass, winterfat, and shadscale. If the range deteriorates, Thurber needlegrass decreases and is gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is best suited to grazing in winter. If the range is in poor condition, it can be reseeded to Siberian wheatgrass, crested wheatgrass, or other suitable grasses. Seedings are most successful late in fall. In some years the available moisture is inadequate, and there is a high chance of seeding failure.

The use of this soil for residential development is limited by the slope and by a hazard of frost action in the soil.

This map unit is in capability subclass VIle, nonirrigated.

195-Urban land. Urban land consists of areas that are covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

This miscellaneous area is not assigned to a capability class.

196-Vanderhoff soils, 30 to 60 percent slopes. These soils are moderately deep and well drained. They formed in residuum and colluvium that derived from mudstone and tuffaceous lacustrine deposits. They are on side slopes above the Snake River. The elevation is 2,400 to 2,900 feet. The average annual precipitation is 8 inches, the average annual temperature is 54 degrees F, and the frost-free period is about 150 days.

This unit consists mainly of Vanderhoff extremely stony loam, 30 to 60 percent slopes, and Vanderhoff very gravelly loam, 30 to 60 percent slopes.

Included in mapping are small areas of Rubble land and Trevino extremely stony silt loam, 5 to 20 percent

slopes. These inclusions make up about 15 percent of this map unit.

In a typical profile of Vanderhoff extremely stony loam, 30 to 60 percent slopes, the surface layer is light gray extremely stony loam about 5 inches thick. The underlying material is light gray and white gravelly loam and fine sandy loam about 17 inches thick. Below that is white mudstone. Depth to the bedrock ranges from 20 to 40 inches. Vanderhoff very gravelly loam, 30 to 60 percent slopes, is similar except for the surface texture.

Permeability is moderate. The root zone extends to a depth of 20 to 40 inches. The available water capacity is moderate. Runoff is very rapid, and the hazard of erosion is very high.

In most areas, these soils are used as wildlife habitat and as rangeland.

The potential natural plant community is dominated by spiny hopsage, shadscale, sparse grass, and forbs. Because the soils are low in content of organic matter and have a low infiltration rate, they have undergone extensive geologic erosion and most of the surface is bare. Therefore, these soils are very limited for forage production.

This map unit is in capability subclass VIIe, nonirrigated.

197-Van Dusen-Payette complex, 30 to 65 percent slopes. The soils in this complex are on alluvial terraces of the Boise Front. The elevation is 3,000 to 4,000 feet. The average annual precipitation is 14 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 140 days.

About 60 percent of the complex is Van Dusen loam, and 20 percent is Payette sandy loam. The rest is Ada gravelly sandy loam, 30 to 60 percent slopes; Brent sandy loam, low rainfall, 30 to 60 percent slopes; Haw loam, 25 to 40 percent slopes; Ladd loam, 30 to 65 percent slopes; and Lankbush sandy loam, 30 to 60 percent slopes.

The Van Dusen soil is very deep and well drained. It formed in acid igneous alluvium. The slopes commonly have a northerly aspect. Typically, the surface layer is dark grayish brown loam about 14 inches thick. The subsoil is grayish brown, brown, and pale brown gravelly loam and coarse sandy clay loam about 30 inches thick. The substratum is pale brown loamy coarse sand to a depth of 60 inches or more.

Permeability of the Van Dusen soil is moderately slow. The root zone extends to a depth of 60 inches or more. The available water capacity is very high. Runoff is very rapid, and the hazard of erosion is very high.

The Payette soil is very deep and well drained. It formed in acid igneous alluvium. Typically, the surface layer is grayish brown sandy loam about 17 inches thick. The subsoil is brown and yellowish brown sandy loam about 17 inches thick. The substratum is light yellowish brown and light gray loamy sand and coarse sand to a depth of 60 inches or more.

Permeability of the Payette soil is moderately rapid. The root zone extends to a depth of 60 inches or more. The available water capacity is high. Runoff is very rapid, and the hazard of erosion is very high.

The soils in this complex are used mainly as rangeland and wildlife habitat.

The potential plant community on the Van Dusen soil is dominated by bluebunch wheatgrass, Idaho fescue, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Idaho fescue decrease and are gradually replaced by cheatgrass and other annuals. Big sagebrush increases.

This soil is suited to grazing in fall and spring and early in summer. Range seeding by conventional methods is limited by the steep slopes.

The potential natural plant community on the Payette soil is dominated by bluebunch wheatgrass and big sagebrush. If the range deteriorates, bluebunch wheatgrass decreases and is gradually replaced by cheatgrass, medusahead wildrye, and other annuals. Big sagebrush increases.

This soil is suited to grazing in spring and fall. Range seeding by conventional methods is limited by the steep slopes.

This complex is in capability subclass VIIe, nonirrigated.

198-Xerollic Haplargids, very steep. These soils are very deep and well drained. They are on terrace escarpments separating alluvial benches. The slope ranges from 10 to 30 percent. The elevation is 2,500 to 3,100 feet. The average annual precipitation is 11 inches, the average annual temperature is 51 degrees F, and the frost-free period is about 150 days.

These soils are too variable in texture and depth to sand and gravel to map as individual units. The surface layer ranges in texture from silt loam to gravelly loam. The subsoil ranges in texture from silty clay loam to very gravelly sandy clay loam. Depth to gravel ranges from less than 1 inch to 60 inches or more. Runoff is medium to very rapid, and the hazard of erosion is moderate to very high.

Included in mapping are small areas of Pipeline silt loam, 8 to 12 percent slopes; Elijah silt loam, 4 to 8 percent slopes; and Power silt loam, 8 to 12 percent slopes. These soils make up about 10 percent of this map unit.

In most areas, these soils are used as rangeland and wildlife habitat.

The potential natural plant community on these soils is dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush. If the range deteriorates, bluebunch wheatgrass and Thurber needlegrass decrease and are replaced by cheatgrass and other annuals. Big sagebrush increases.

These soils are best suited to grazing in fall and early in spring. Range seeding is limited by droughtiness.

The use of these soils for residential development is limited by slope.

This map unit is in capability subclass VIle, nonirrigated.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture; as rangeland; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and as wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section.

In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

In 1977, approximately 149,000 acres in the Ada County Area was used for crops and pasture. Of this, about 112,000 acres was irrigated cropland, 15,000 acres was dry cropland, and 22,000 acres was pasture and hayland. Ada County Area is largely in a livestock economy; therefore, much of the land is used for improved pasture and for hay, grain, and silage for livestock feed.

Sweet corn for seed and processing, alfalfa, clover for seed, and mint are also grown. A small acreage is used for fruit orchards and for specialty crops such as vegetables for seed. Sugar beets and potatoes are not grown extensively, mainly because most of the soils in the survey area are too clayey. The clayey soils limit the yield and quality of these crops and impede field implements. Sugar beets and potatoes are grown on a small acreage in the southwestern part of the survey area and north of Star, where the soils are lighter textured.

Throughout most of the survey area, the natural vegetation consists mainly of range grasses and sagebrush, and most of the soils that are used as cropland must be irrigated. Corrugation, furrow, border, and sprinkler irrigation systems are commonly used on the soils in this survey area. On most surface-irrigated farmland in the area, efforts have been made to improve irrigation effectiveness and efficiency. These efforts include smoothing the land, reorganizing fields, lining ditches with concrete, and installing water-control structures. Nevertheless, overirrigation on surface-irrigated land is still a serious problem in many areas. The water table is high in many soils, especially those on the Boise River floodplain and the adjacent terraces.

Sprinkler irrigation is being used on most new cropland. The surface irrigation systems on many older farms are being replaced by sprinkler systems. The benefits of sprinkling include better irrigation efficiency and less need for extensive land smoothing operations. The latter benefit is important in the Ada County Area since many of the soils have a thin topsoil over a heavy textured subsoil. Many of the soils are also underlain by a cemented hardpan that is directly over bedrock. The deep

cuts required in land smoothing expose the less desirable soil, and as a result, crop production and crop selection are reduced.

On the steeper soils, erosion is a problem if surface or sprinkler irrigation is used. Erosion is a serious problem on the silty soils south of Kuna that have been developed as farmland. The infiltration rate of these soils is slower than that normally expected of silt loam soils. The slow infiltration rate is due, in part, to the effects of the exchangeable sodium, the low content of organic matter, and the weak surface structure. The first few years under cultivation are the most critical for the soils. Erodibility is reduced drastically after 2 or 3 years of good management. By then, the structure has been improved and the content of organic matter has been increased by adding crop residue to the surface.

Proper management of irrigation water and a conservation cropping system are important in reducing erosion. Excessively steep, highly erodible soils should be planted to permanent pasture, used as wildlife habitat, or left undisturbed. If they are cultivated, minimum tillage can help to offset the hazard of erosion and increase the infiltration rate of the soil.

Minimum tillage, crop residue management, and farming across the slope are very important management practices in preventing erosion on dryfarmed soils in the foothills. Diversions, waterways, and other conservation practices are beneficial in some areas. Some of the more nearly level soils near Orchard that are being dryfarmed are subject to wind erosion. Stubble mulching and barrier strips can prevent soil blowing on these soils.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the soil is not suited to the crop, or the crop is not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop

varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown; that good quality irrigation water is uniformly applied in proper amounts as needed; and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. For the purpose of this survey, only capability classes and subclasses have been identified. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability class or subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Rangeland

Glen M. Secrist, area range conservationist, assisted in writing this section.

Livestock are important to the agricultural economy of Ada County, and about 58 percent of the survey area is rangeland. Sheep and cattle use the rangeland primarily in spring, fall, and winter. In all parts of the survey area except the northeast, the land is generally not grazed in summer because of the hot temperatures and lack of water.

Loamy soils prevail throughout most of the survey area; therefore, precipitation is generally the limitation to the productivity of these soils. The soils in the north and northeast parts of the survey area produce the most forage because they receive the most precipitation. The average annual precipitation declines to the west and southwest, and forage production declines accordingly.

Where climate and topography are about the same, differences in the kind and amount of vegetation that rangeland can produce are related closely to the kind of

soil. Effective management is based on the relationships among soils, vegetation, and water.

Table 6 shows, for each kind of soil, the name of the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the expected percentage of each species in the composition of the potential natural plant community. Soils not listed cannot support a natural plant community of predominately grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. The following are explanations of column headings in table 6.

A *range site* is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. Soils that produce a similar kind, amount, and proportion of range plants are grouped into range sites. For those areas where the relationship between soils and vegetation has been established, range sites can be interpreted directly from the soil map. Properties that determine the capacity of the soil to supply moisture and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production refers to the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year the amount and distribution of precipitation and the temperatures are such that growing conditions are substantially better than average; in a normal year these conditions are about average for the area; in an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight refers to the total air-dry vegetation produced per acre each year by the potential natural plant community. Vegetation that is highly palatable to livestock and vegetation that is unpalatable are included. Some of the vegetation can also be grazed extensively by wildlife.

Characteristic vegetation-grasses, grasslike plants, forbs, and shrubs that make up most of the potential natural plant community on each soil-are listed by common name. Under *Composition*, the expected proportion of each species is presented as the percentage, in air-dry weight, of the total annual production of herbaceous and woody plants. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season. Generally all of the vegetation produced is not used.

Range management requires, in addition to knowledge of the kinds of soil and the potential natural plant community, an evaluation of the present condition of the range vegetation in relation to its potential. Range condition is determined by comparing the present plant community with the potential natural plant community on a

particular range site. The more closely the existing community resembles the potential community, the better the range condition. The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the maximum production of vegetation, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

In many areas of the survey area, forage production has been reduced by excessive use and frequent fires. In considerably large areas, cheatgrass, medusahead wildrye and other annual grasses have replaced the more desirable perennial grasses. On some sites, big sagebrush has greatly increased; as a result, the production of more desirable perennial grasses, forbs, and shrubs has decreased.

Most rangeland responds favorably to deferment of grazing in spring or throughout the growing season of the endangered plants. On selected sites in some areas, the potential natural plant community is so reduced that reseeding, or reseeding and brush control, may be necessary. Sound range management based on soil survey information and other rangeland inventory information is the basis for maintaining or improving forage production.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope sta-

bility, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational areas; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the large scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil are included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 7 shows, for each kind of soil, the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 10, for water management. Table 9 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements,

small commercial buildings, and local roads and streets are indicated in table 7. A *slight* limitation indicates that soil properties generally are favorable for the specified use and that any limitations are minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, costly measures may not be feasible.

Shallow excavations are made for pipelines, sewer lines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material

available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, and *poor*, which mean about the same as *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard if the seasonal high water table is above the level of the lagoon floor. If the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 8 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

If it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the site should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 9 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 13 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low frost action potential, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the

material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can restrict plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils or very firm clayey soils; soils that have suitable layers less than 8 inches thick; soils that have large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 10 the soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has

favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of the soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 10 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Arthur V. Collins, Ada Planning Association, assisted in writing this section.

The contrasting land features—the flood plains, foothills, and canyons—and the mild climate attract hikers, horseback riders, hunters, rock hounds, photographers, campers, and cyclists. The upland game birds and big game attract hunters. Tubing, canoeing, kayaking, or rafting on the Boise River are popular summer sports. Lucky Peak Reservoir is a popular site for water sports and for hunting migratory waterfowl.

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, availability of potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity

of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect

the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of habitat are very severe and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide

food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are fescue, lupine, arrowleaf, balsamroot, and bluegrass.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Examples of shrubs are mountain-mahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, saltgrass, cordgrass and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Open/and habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include pheasant, meadowlark, field sparrow, cottontail rabbit, and red fox.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Rangeland habitat consists of areas of wild herbaceous plants and shrubs. Wildlife attracted to rangeland include antelope, white-tailed deer, Rocky mountain mule deer, sage grouse, meadowlark, and lark bunting.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 13 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (2) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (1).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes-eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

The percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and in plasticity index is estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon at the

depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Clay is a mineral soil particle that is less than 0.002 millimeter in diameter. In table 14 the estimated clay content of each major soil horizon is given as a percent, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In table 14 the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and structure of soil.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field-particularly soil structure, porosity, and gradation or texture-that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management. Permeability ratings should not be used as infiltration rates since these values usually differ significantly.

Available water capacity is rated on the basis of soil characteristics that influence ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, values have been verified by laboratory analyses. Soil reaction is important in se-

lecting crops, ornamental plants, and other plants to be grown; and in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in table 14. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Wind erodibility groups are made up of soils that have similar properties that affect their resistance to soil blowing if cultivated. The groups are used to predict the susceptibility of soil to blowing and the amount of soil lost as a result of blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are extremely erodible, so vegetation is difficult to establish. They are generally not suitable for crops.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly

erodible, but crops can be grown if intensive measures to control soil blowing are used.

- 4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible, but crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible, but crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible, but crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible, and crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible, and crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter of the plow layer is expressed as a percent, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth of the soil. It is a source of nitrogen and other nutrients for crops.

Soil and water features

Table 15 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse

texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 15 are the depth to the water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Cemented pans are hard subsurface layers, within a depth of 5 or 6 feet, that are strongly compacted (indurated). Such pans cause difficulty in excavation. The hardness of pans is similar to that of bedrock. A rippable pan can be excavated, but a hard pan generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (5). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or

of factors that affect soil genesis. In table 16, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquents (*Hapl*, meaning simple horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (4). Unless otherwise noted, colors described are for dry soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Abo series

The Abo series consists of very deep, somewhat poorly drained soils. These soils formed in mixed alluvium. They are in broad drainageways and on low alluvial terraces and have slopes of 0 to 3 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Abo soils are similar to Oliaga Variant soils. They are near Elijah, McCain, Oliaga Variant, Pipeline, Power, Purdam and Sebree soils. Unlike Abo soils, Oliaga Variant soils do not have an argillic horizon. Elijah, Purdam, and Sebree soils have a hardpan between depths of 20 and 40 inches. McCain soils are 20 to 40 inches deep to basalt. Pipeline soils are less than 20 inches deep to a hardpan. Power soils are well drained.

Typical pedon of Abo silt loam about 2 1/2 miles northwest of Meridian, approximately 780 feet north and 390 feet west of the SE cor. of sec. 34, T. 4 N., R. 1 W.

Ap-0 to 10 inches; light brownish gray (10YR 6/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; hard, friable, slightly sticky and slightly plastic; many very fine, common fine, and few coarse roots; few coarse tubular pores; moderately alkaline; gradual smooth boundary.

B21tca-10 to 17 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine and few fine roots; many very fine and few medium and coarse tubular pores; common thin clay films on peds and many thick clay films in pores; weak lime accumulation in pores; moderately alkaline; clear smooth boundary.

B22tca-17 to 23 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; brown (10YR 4/3) moist crushed; few fine distinct dark reddish brown (5YR 3/3) moist mottles; moderate medium subangular blocky structure; slightly hard,

friable, sticky and plastic; many very fine and few fine roots; common very fine and fine and few medium and coarse tubular pores; many thick clay films on peds and common thick clay films in pores; few fine lime filaments; moderately alkaline; clear wavy boundary.

C1ca-23 to 29 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; few fine distinct dark reddish brown (5YR 3/3) moist mottles; weak fine and medium subangular blocky structure; soft, very friable, sticky and plastic; common fine roots; common very fine and fine and few medium and coarse tubular pores; few fine lime veins; strongly effervescent; strongly alkaline; clear wavy boundary.

C2ca-29 to 38 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; common, medium, distinct dark reddish brown (5YR 3/3) moist mottles; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; slightly calcareous; mildly alkaline; clear wavy boundary.

C3-38 to 58 inches; light yellowish brown (10YR 6/4) loam, dark brown (10YR 3/3) moist; few medium and large distinct very dark gray (2.5YR 3/0) moist mottles; massive; hard, firm, slightly sticky and slightly plastic; common very fine and fine tubular pores; mildly alkaline; abrupt wavy boundary.

IIC4-58 to 65 inches; pale brown (10YR 6/3) fine gravelly coarse sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; 20 percent fine pebbles; mildly alkaline.

The A horizon is light brownish gray or brown. It does not contain the organic carbon required to qualify it as a mollic epipedon.

The B horizon is pale brown, grayish brown, light brownish gray, or brown.

The C horizon is pale brown, light yellowish brown, or very pale brown silt loam to gravelly coarse sandy loam. Mottling occurs at a depth of 15 to 30 inches. The water table is at a depth of 3 to 5 feet at the peak of the irrigation season unless the soil is artificially drained.

Ada series

The Ada series consists of very deep, well drained soils. These soils formed in coarse, granitic alluvium. They are on alluvial terraces and have slopes of 4 to 60 percent. The average annual precipitation is 14 inches, and the average annual temperature is 50 degrees F.

Ada soils are near Brent, Day, Ladd, Searles, Tenmile, and Van Dusen soils. Brent and Van Dusen soils are less than 35 percent rock fragments in the control section. Day soils are more than 60 percent clay, and they do not contain coarse fragments in the profile. Ladd soils do not contain coarse fragments in the argillic horizon, and they are less than 35 percent clay. Searles soils are

less than 35 percent clay in the control section. Tenmile soils do not have a mollic epipedon.

Typical pedon of Ada gravelly sandy loam, 30 to 60 percent slopes, about 1/2 mile north of Lucky Peak Dam, approximately 1,200 feet south and 190 feet west of the NE cor. of sec. 2, T. 2 N., R. 3 E.

A1-0 to 10 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine interstitial pores; 30 percent pebbles; neutral; clear smooth boundary.

B21t-10 to 18 inches; brown (7.5YR 5/4) very gravelly sandy clay, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; about 40 percent pebbles; continuous thick clay films on peds, many thick clay films on pebbles; many thick pressure cutans around pebbles; neutral; gradual wavy boundary.

B22t-18 to 28 inches; brown (7.5YR 4/4) very gravelly sandy clay, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; about 40 percent pebbles; continuous thick clay films on peds, many thick clay films on pebbles; many thick pressure cutans around pebbles; neutral; gradual wavy boundary.

B23t-28 to 37 inches; brown (7.5YR 4/4) very gravelly sandy clay, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and plastic; few very fine tubular pores; 45 percent pebbles; many thick clay films on peds and on pebbles; many thick pressure cutans around pebbles; neutral; diffuse wavy boundary.

C1-37 to 47 inches; light brown (7.5YR 6/4) very gravelly loamy coarse sand, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 60 percent pebbles; neutral; gradual wavy boundary.

C2-47 to 80 inches; variegated sand and gravel; single grain; loose; 60 percent pebbles, 10 percent cobbles; neutral.

The A horizon is dark grayish brown or grayish brown.

The B horizon is brownish gray, brown, or yellowish brown very gravelly sandy clay or very gravelly clay.

The C horizon is light brown, very pale brown, or variegated very gravelly sand to very gravelly loamy coarse sand.

Baldock series

The Baldock series consists of very deep, poorly drained soils. These soils formed in dominantly acid igneous alluvium. They are on low alluvial terraces adja-

cent to the Boise River and have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Baldock soils are similar to Bram, Drax, and Goose Creek soils. They are near Bram, Falk, Moulton, and Notus soils. Unlike Baldock soils, Bram soils are less than 18 percent clay and less than 15 percent material that is coarser than very fine sand in the control section. Drax, Goose Creek, and Moulton soils have a mollic epipedon. Falk soils have contrasting textures in the control section. Notus soils are more than 35 percent coarse fragments in the control section.

Typical pedon of Baldock loam, in the Veteran Memorial Park, approximately 1,240 feet north and 825 feet west of the SE cor. of sec. 32, T. 4 N., R. 2 E.

Apc-0 to 8 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B2ca-8 to 19 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately calcareous; strongly alkaline; gradual smooth boundary.

C1ca-19 to 34 inches; light brownish gray (2.5Y 6/2) loam, dark gray (10YR 4/1) moist; common distinct dark brown (7.5YR 4/4) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; slightly calcareous; mildly alkaline; gradual wavy boundary.

C2-34 to 45 inches; gray (5Y 6/1) loam, very dark gray (5Y 3/1) moist; common fine prominent dark yellowish brown (10YR 4/4) moist mottles; massive; hard, friable, sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; mildly alkaline; gradual wavy boundary.

C3-45 to 60 inches; gray (2.5Y 6/2) fine sandy loam, olive gray (5Y 5/2) moist; common fine yellowish red (5YR 5/6) and yellowish brown (10YR 5/4) moist mottles; massive; hard, very friable, slightly sticky, and nonplastic; few very fine roots; few very fine and fine tubular pores; mildly alkaline.

The Ap horizon is light brownish gray or gray and slightly or moderately calcareous.

The B2ca horizon is light brownish gray or gray loam or silt loam, and it is slightly or moderately calcareous.

The C horizon is loam, very fine sandy loam, or fine sandy loam.

Most pedons are noncalcareous in the lower C horizons, and some are calcareous throughout. The water

table is at a depth of 24 to 36 inches at the peak of the irrigation season unless the soil is artificially drained.

Beetville series

The Beetville series consists of very deep, moderately well drained soils. These soils formed in stratified, acid igneous alluvium. They are on low terraces adjacent to the Boise River and have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Beetville soils are similar to Cashmere, Jenness, and Turbyfill soils. They are near Drax, Falk, Goose Creek, and Moulton soils. Unlike Beetville soils, Cashmere soils do not show an irregular decrease in organic carbon with depth. Jenness and Turbyfill soils do not have mollic epipedon. Goose Creek soils have a mollic epipedon that is more than 20 inches thick, and they are more than 18 percent clay in the control section. Drax soils are more than 18 percent clay in the control section. Falk and Moulton soils have strongly contrasting particle size classes in the control section.

Typical pedon of Beetville fine sandy loam, about 4 miles east of Eagle, approximately 820 feet south and 410 feet west of the NE cor. of the SW 1/4 of sec. 13, T. 4 N., R. 1 E.

Ap-0 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; abrupt smooth boundary.

A12-10 to 14 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; clear smooth boundary.

C1-14 to 25 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; mildly alkaline; clear smooth boundary.

C2ca-25 to 32 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; common medium faint dark yellowish brown (10YR 4/4) moist mottles; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; common fine lime veins; slightly effervescent; mildly alkaline; clear wavy boundary.

IIC3-32 to 47 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; common medium distinct dark brown (7.5YR 4/4) moist mottles; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; mildly alkaline; clear smooth boundary.

IIIC4-47 to 60 inches; variegated loamy coarse sand; single grain; loose; few very fine roots; few very fine tubular pores; neutral.

The A horizon is grayish brown or dark grayish brown. The C horizon is light brownish gray, very pale brown, pale brown, or variegated. The texture above a depth of 40 inches is sandy loam, fine sandy loam, or loam.

Most pedons have C horizons between depths of 40 and 60 inches; the textures range from loamy sand to sand and gravel. In most pedons, one or more of the C horizons is slightly calcareous.

The control section is stratified with textures ranging from loam to sandy loam. Some pedons have buried A horizons. The water table is at a depth of 48 to 72 inches at the peak of the irrigation season unless the soil is artificially drained.

Bissell series

The Bissell series consists of very deep, well drained soils. These soils formed in dominantly acid igneous alluvium. They are on low alluvial terraces and have slopes of 0 to 4 percent. The average annual precipitation is 12 inches, and the average annual temperature is 51 degrees F.

Bissell soils are similar to Baldock, Drax, Goose Creek, Harpt, and Haw soils. They are near Bram, Drax, Falk, Moulton, and Notus soils. Unlike Bissell soils, Baldock, Bram, Falk, and Notus soils do not have a mollic epipedon and an argillic horizon. Drax, Goose Creek, Harpt, and Moulton soils do not have an argillic horizon. Haw soils have an accumulation of lime within a depth of 40 inches.

Typical pedon of Bissell loam, 0 to 2 percent slopes, about 1 mile northwest of Eagle, approximately 190 feet south and 190 feet west of the NW cor. of the SW1/4 of sec. 5, T. 4 N., R. 1 E.

Ap-0 to 9 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium granular structure; very hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; neutral; clear smooth boundary.

B2t-9 to 17 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; common thin clay films on peds and in pores; neutral; clear smooth boundary.

B3-17 to 46 inches; pale brown (10YR 6.3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

IIC-46 to 60 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; single grain; loose; neutral.

The A horizon is brown or grayish brown.

The B horizon is pale brown, brown, or grayish brown loam, clay loam, or sandy clay loam.

The C horizon is pale brown or light yellowish brown loam, loamy sand, or sandy loam. In some pedons there are weak Cca horizons below a depth of 40 inches.

Bowns series

The Bowns series consists of moderately deep, well drained soils. These soils formed in loess or silty alluvium on basalt plains and ridges. The slopes are 0 to 15 percent. The average annual precipitation is 12 inches, and the average annual temperature is 52 degrees F.

Bowns soils are similar to Brent, Chardoton, and Chilcott soils. They are near Chardoton, Chilcott, Kiesel Variant, Kunaton, McCain, Power, and Sebree soils. Unlike the Bowns soils, Brent soils are more than 40 inches deep and have a thick surface layer. Chardoton and Power soils are more than 40 inches deep. Chilcott and Sebree soils have a hardpan at a depth of 20 to 40 inches. Kiesel Variant soils have a natric horizon. Kunaton soils have a hardpan at a depth of 10 to 20 inches. McCain soils are less than 35 percent clay in the control section.

Typical pedon of Bowns stony loam, 0 to 8 percent slopes, about 3 miles southwest of Orchard, approximately 80 feet south and 165 feet east of the NW cor. of the SE1/4 of sec. 35, T. 1 S., R. 3 E.

A21-0 to 2 inches; pale brown (10YR 6/3) stony loam, dark brown (10YR 3/3) moist; moderately thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine vesicular and few fine tubular pores; 1 percent stones; mildly alkaline; abrupt smooth boundary.

A22-2 to 7 inches; light yellowish brown (10YR 6/4) stony loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine vesicular and tubular pores; 1 percent stones; abrupt wavy boundary.

B21t-7 to 15 inches; pale brown (10YR 6/3) silty clay loam, dark yellowish brown (10YR 3/4) moist; light brownish gray (10YR 6/2) silt coatings on faces of peds; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and plastic; common very fine and fine roots; common thin clay films on peds and in pores; 5 percent basalt pebbles; neutral; gradual wavy boundary.

B22t-15 to 20 inches; light yellowish brown (10YR 6/4) silty clay, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure parting to strong

medium angular blocky; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; continuous moderately thick clay films on peds and in pores; 5 percent basalt pebbles; mildly alkaline; clear smooth boundary.

B23t-20 to 28 inches; yellowish brown (10YR 5/4) silty clay, dark yellowish brown (10R 4/6) moist; moderate medium prismatic structure parting to strong fine angular blocky; hard, firm, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; continuous thick clay films on peds and in pores; 5 percent basalt pebbles; 10 percent very hard cicada krotovina; common large lime splotches and veins in lower part of horizon; strongly alkaline; clear smooth boundary.

Cca-28 to 35 inches; very pale brown (10YR 7/3) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 10 percent basalt pebbles; 15 percent durinodes; slightly calcareous matrix that contains many large splotches and veins of very strongly calcareous soft powdery lime; strongly alkaline; abrupt wavy boundary.

R-35 inches; highly jointed and fractured basalt.

The Cca horizon is very pale brown, light gray, or white silt loam or loam. It is 5 to 15 percent very hard cicada krotovina.

The profile is 0 to 15 percent basalt pebbles and 0 to 8 percent stones. The surface cover is 0 to 15 percent cobbles and about 1 to 15 percent stones on the surface. Bedrock is at a depth of 20 to 40 inches.

Bram series

The Bram series consists of very deep, somewhat poorly drained soils. These soils formed in mixed alluvium. They are on low alluvial terraces adjacent to the Boise River and have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Bram soils are near Baldock, Bissell, Chance, Falk, Goose Creek, Moulton, and Notus soils. Unlike Bram soils, Baldock and Goose Creek soils are more than 18 percent clay in the control section. Bissell soils have an argillic horizon. Chance soils are very poorly drained. Falk and Moulton soils have strongly contrasting particle-size classes in the control section. Notus soils have a sandy-skeletal control section.

Typical pedon of Bram silt loam, about 1/2 mile northeast of Star, approximately 190 feet west and 470 feet south of the NE cor. of sec. 8, T. 4 N., R. 1 W.

A1-0 to 3 inches; light brownish gray (10YR 6/2) silt loam, brown (10YR 4/3) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular and vesicular

pores; slightly calcareous; very strongly alkaline; clear wavy boundary.

B2ca-3 to 19 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine and fine tubular and interstitial pores; strongly calcareous; strongly alkaline; gradual wavy boundary.

C1ca-19 to 26 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; common fine faint dark brown (10YR 4/3) moist mottles; massive; hard, friable, nonsticky and nonplastic; common fine and medium roots; common very fine and fine tubular pores; strongly calcareous; moderately alkaline; gradual wavy boundary.

C2-26 to 33 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; common fine faint brown (10YR 4/3) moist mottles; massive; hard, friable, nonsticky and nonplastic; many very fine and fine and common medium roots; common very fine and fine tubular pores; about 5 percent weakly cemented cicada krotovina nodules; mildly alkaline; clear wavy boundary.

C3-33 to 60 inches; very pale brown (10YR 7/4) very fine sandy loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; mildly alkaline.

The A horizon is pale brown or light brownish gray. The B horizon is pale brown and brown very fine sandy loam or silt loam.

The C horizon is pale brown, very pale brown, or light yellowish brown.

In some pedons, sand occurs below a depth of 40 inches.

The water table is at a depth of 40 to 60 inches at the peak of the irrigation season unless the soils are artificially drained.

Brent series

The Brent series consists of very deep, well drained soils. These soils formed in acid igneous alluvium. They are on terraces in foothills and mountains and have slopes of 0 to 65 percent. The average annual precipitation is 13 inches, and the average annual temperature is 50 degrees F.

Brent soils are similar to Bowns and Chardoton soils. They are near Ada, Day, Haw, Ladd, Lankbush, and Searles soils. Unlike Brent soils, Ada soils are more than 35 percent gravel in the control section. Bowns and Searles soils are underlain by bedrock at a depth of 20 to 40 inches. Chardoton soils have a thin surface layer. Day soils are more than 60 percent clay in the control section. Haw, Ladd, and Lankbush soils are less than 35 percent clay in the control section.

Typical pedon of Brent loam, 4 to 12 percent slopes, about 3/4 mile north of Table Rock, approximately 1,265 feet north and 110 feet east of the SW cor. of the NE1/4 of sec. 12, T. 3 N., R. 2 E.

A11-0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very thin platy structure parting to weak very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; clear wavy boundary.

A12-5 to 12 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine vesicular and tubular pores; mildly alkaline; clear wavy boundary.

A2-12 to 18 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; moderate thin and medium platy structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

B21t-18 to 21 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; brown (10YR 4/3) coatings on faces of peds; weak medium and fine prismatic structure parting to moderate fine subangular blocky; very hard, firm, sticky and plastic; few very fine and fine roots; many moderately thick clay films on peds and in pores; mildly alkaline; abrupt wavy boundary.

B22t-21 to 29 inches; brown (10YR 4/3) clay, dark brown (7.5YR 4/2) moist; strong medium and fine prismatic structure parting to strong medium angular blocky; very hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine and fine tubular pores; continuous moderately thick clay films on peds and in pores; few fine lime veins between peds in the lower 1 1/2 inches; moderately alkaline; clear wavy boundary.

B31tca-29 to 34 inches; very pale brown (10YR 8/3) clay, pale brown (10YR 6/3) moist; many large faint yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and plastic; few fine and very fine roots; many fine and very fine tubular pores; common moderately thick clay films on peds and in pores; many large splotches of lime throughout peds; strongly calcareous; moderately alkaline; clear wavy boundary.

B32tca-34 to 40 inches; brown (10YR 5/3) clay, brown (7.5YR 5/4) moist; weak thick platy structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; many very fine and fine tubular pores; common moderately thick clay films on peds and in pores; common medium veins and splotches of lime

on faces of peds; moderately calcareous; moderately alkaline; clear smooth boundary.

IIC1ca-40 to 46 inches; pink (7.5YR 7/4) gravelly clay loam, brown (7.5YR 5.4) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine and very fine tubular pores; 20 percent pebbles; common medium lime veins and splotches; moderately calcareous; moderately alkaline; clear smooth boundary.

IIIC2ca-46 to 64 inches; pink (7.5YR 8/4) gravelly loamy coarse sand, very pale brown (10YR 7/3) moist; massive; hard, friable; 25 percent pebbles; slightly calcareous; moderately alkaline.

The A horizon is grayish brown, gray, or dark grayish brown. It does not contain the organic carbon required to classify it as a mollic epipedon. The A2 horizon is light gray, grayish brown, very pale brown, or light brownish gray very fine sandy loam, sandy loam, loam, or silt loam.

The B horizon is grayish brown, brown, very pale brown, yellowish brown, light yellowish brown, or pale brown clay, clay loam, silty clay loam, or silty clay.

The C horizon is pink, light gray, pale brown, or very pale brown. The texture is gravelly clay loam, silt loam, loam, and sandy loam to very gravelly coarse sand, and it is commonly stratified.

Cashmere series

The Cashmere series consists of very deep, well drained soils. These soils formed in acid igneous alluvium. They are on alluvial fans in the foothills and have slopes of 0 to 30 percent. The average annual precipitation is 12 inches, and the average annual temperature is 50 degrees F.

Cashmere soils are similar to Harpt, Jenness, and Payette soils. They are near Harpt, Haw, Jenness, Lankbush, Payette, Tindahay, and Van Dusen soils. Unlike Cashmere soils, Harpt soils are more than 18 percent clay in the control section; and in these soils, the content of organic matter decreases irregularly with an increase in depth. Jenness soils do not have a mollic epipedon. Haw, Lankbush, and Payette soils have an argillic horizon, and they contain carbonates. Tindahay soils have a sandy control section. Van Dusen soils have a mollic epipedon that is more than 20 inches thick.

Typical pedon of Cashmere coarse sandy loam, 0 to 4 percent slopes, about 2 miles north of Boise, approximately 1,000 feet north and 770 feet east of the SW cor. of sec. 26, T. 4 N., R. 2 E.

A1-0 to 6 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak very thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine interstitial pores; neutral; abrupt smooth boundary.

B2-6 to 15 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure; slightly hard, friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine and few fine tubular pores; neutral; clear smooth boundary.

C1-15 to 58 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and few very fine roots; many very fine and few fine tubular pores; neutral; gradual smooth boundary.

C2-58 to 72 inches; brown (10YR 5/3) loamy coarse sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine and few fine tubular pores; neutral.

The A horizon is brown or grayish brown. The mollic epipedon is 12 to 18 inches thick.

The B horizon is grayish brown, brown, or pale brown coarse sandy loam or sandy loam.

The C horizon is brown, light brownish gray, or pale brown. The texture is coarse sandy loam or sandy loam above a depth of 40 inches, and in some pedons loamy coarse sand or coarse sandy loam below a depth of 40 inches.

Chance series

The Chance series consists of very deep, very poorly drained soils. These soils formed in recent alluvium. They are in old river channels and in depressions on the flood plain of the Boise River. The slopes are 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Chance soils are similar to Falk, Moulton, Oliaga Variant, and Tindahay soils. They are near Bram, Falk, Moulton, and Notus soils. Bram soils are calcareous throughout. Falk soils are somewhat poorly drained and have chroma of 2 or 3. Moulton soils have a mollic epipedon and chroma of 1.5 or 2. Notus soils have a sandy-skeletal control section. Oliaga Variant soils are somewhat poorly drained and are calcareous throughout. Tindahay soils are well drained.

Typical pedon of Chance fine sandy loam, about 1 1/2 miles south and 1 1/2 mile east of Star, approximately 50 feet south and 880 feet east of the NW cor. of the SE 1/4 of sec. 20, T. 4 N., R. 1 W.

O1-1 inch to 0; dark gray (10YR 4/1) partially decomposed grasses and sedges and about 30 percent fine sandy loam, gray (10YR 5/1) dry; massive; medium acid; abrupt smooth boundary.

A1g-0 to 8 inches; gray (10YR 6/1) fine sandy loam, very dark gray (10YR 3/1) moist; common fine faint yellowish brown (10YR 5/4) mottles; weak fine granular structure; very hard, very friable, nonsticky

and nonplastic; common very fine and fine and few medium roots; many fine interstitial and common very fine and fine tubular pores; slightly calcareous; mildly alkaline; gradual smooth boundary.

B2g-8 to 16 inches; gray (10YR 6/1) fine sandy loam, dark gray (10YR 4/1) moist; common fine distinct dark brown (7.5YR 4/4) moist mottles; weak medium subangular blocky structure; hard, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

C1g-16 to 29 inches; gray (10YR 6/1) fine sandy loam, dark gray (10YR 4/1) moist; common fine and medium prominent olive (5Y 4/4) and few fine prominent black (5YR 2/1) moist mottles; massive; hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

C2g-29 to 33 inches; gray (10YR 6/1) loamy fine sand, dark gray (10YR 4/1) moist; common fine and medium prominent olive (5Y 4/4) moist mottles; single grain; loose; few very fine and fine roots; neutral; abrupt smooth boundary.

IIC3-33 to 60 inches; variegated very gravelly fine sand; single grain; loose; neutral.

In some pedons there is no O1 horizon.

The A horizon is very dark gray, dark gray or gray. It is darker than 5.5 dry or 3.5 moist. In some pedons there is no slight accumulation of lime.

The B horizon is dark gray or dark grayish brown.

The C horizon is dark gray or variegated. It is fine sandy loam and loamy fine sand in the upper part and sand and gravel in the lower part. The lower part of the C horizon is 35 to 50 percent gravel and 10 percent cobbles.

The water table is at a depth of 0 to 10 inches.

Chardoton series

The Chardoton series consists of very deep, well drained soils. These soils formed in loess over silty alluvium (fig. 9). They are on old alluvial terraces that overlie a basalt plain. The slopes are 0 to 4 percent. The average annual precipitation is 12 inches, and the average annual temperature is 52 degrees F.

Chardoton soils are similar to Bowns, Brent, and Chilcott soils. They are near Bowns, Chilcott, Kiesel Variant, and Lankbush soils. Unlike Chardoton soils, Bowns soils are underlain by bedrock at a depth of 20 to 40 inches. Brent soils have a thick surface layer. Chilcott soils have a duripan at a depth of 20 to 40 inches. Kiesel Variant soils have more than 15 percent sodium saturation. Lankbush soils are less than 35 percent clay in the control section.

Typical pedon of Chardoton silty clay loam, 0 to 2 percent slopes, about 4 miles south of Orchard, 250 feet

north and 50 feet east of the SW cor. of sec. 8, T. 2 S., R. 4 E.

A1-0 to 1 inch; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular and interstitial pores; neutral; abrupt smooth boundary.

A2-1 inch to 2 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate very thin platy structure parting to strong fine granular; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine vesicular and very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

B21t-2 to 5 inches; brown (10YR 4/3) silty clay, dark brown (10YR 3/3) moist; pale brown (10YR 6/3) silt coatings on peds; strong medium subangular blocky structure parting to strong very fine angular blocky; hard, firm, sticky and plastic; many very fine roots; many fine interstitial and common very fine tubular pores; continuous moderately thick clay films on peds and in pores; mildly alkaline; abrupt wavy boundary.

B22t-5 to 12 inches; light yellowish brown (10YR 6/4) silty clay, dark brown (10YR 4/3) moist; dark yellowish brown (10YR 3/4) moist coatings on peds; strong coarse prismatic structure parting to strong coarse and medium angular blocky; very hard, very firm, very sticky and very plastic; common very fine roots between peds and few very fine roots on the peds; common very fine and fine tubular pores; continuous thick clay films on peds and in pores; moderately alkaline; clear wavy boundary.

B23t-12 to 18 inches; pale brown (10YR 6/3) silty clay, dark brown (10YR 4/3) moist; common large faint dark yellowish brown (10YR 3/4) organic stains on peds; strong medium angular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; continuous moderately thick clay films on peds and in pores; moderately alkaline; clear wavy boundary.

B24t-18 to 24 inches; pale brown (10YR 6/3) silty clay, dark brown (10YR 4/3) moist; dark yellowish brown (10YR 4/4) coatings on faces of peds; strong medium angular blocky structure; block-like fragments; hard, firm, sticky and plastic; common very fine roots; few very fine tubular pores; common moderately thick clay films on fragments and in pores; 20 percent cicada nodules; common fine lime veins; slightly calcareous; moderately alkaline; abrupt wavy boundary.

IIB25tca-24 to 28 inches; light yellowish brown (10YR 6/4) clay loam, dark brown (10YR 4/3) moist; dark

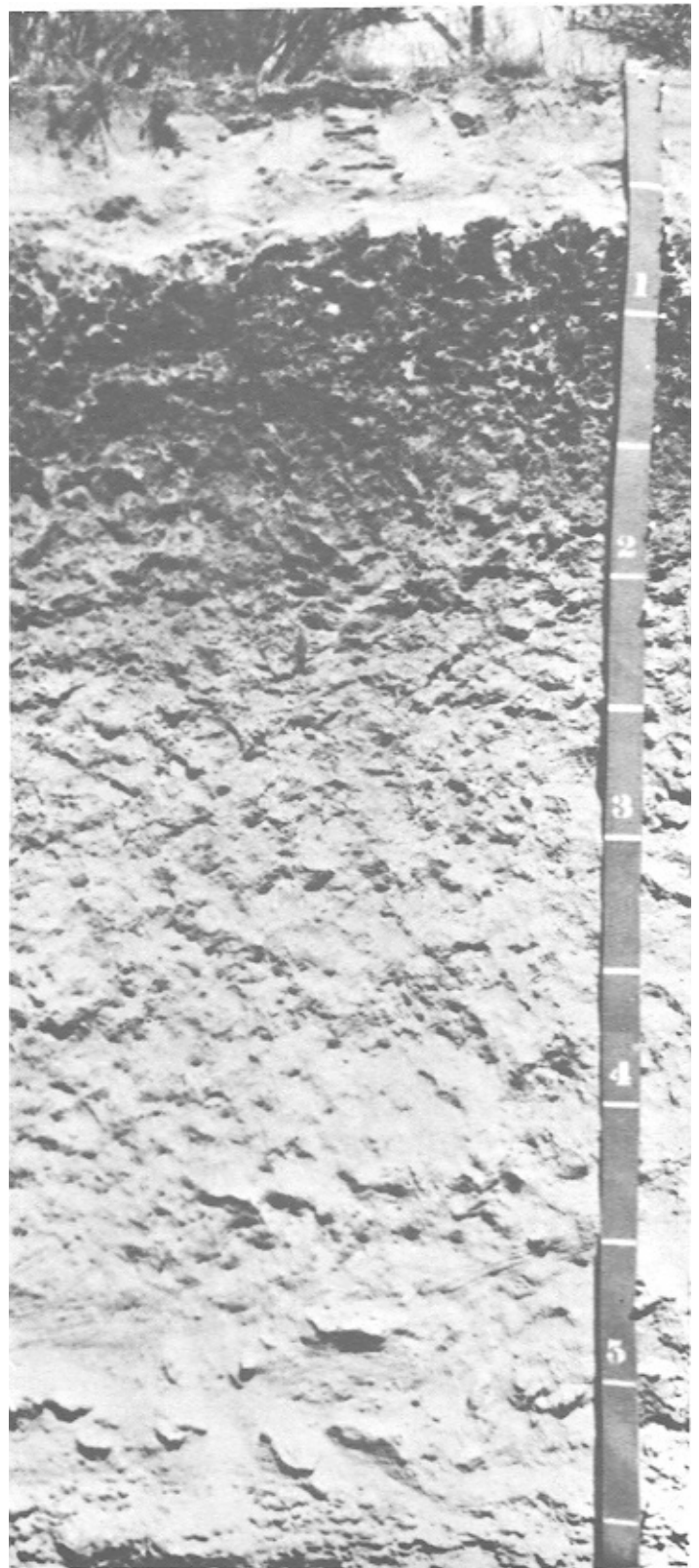


Figure 9.-This profile of a Chardoton soil shows the abrupt change in texture within a depth of 10 inches.

yellowish brown (10YR 4/4) coatings on faces of peds; strong medium angular blocky structure; block-like fragments; hard, firm, sticky and plastic; common very fine roots; few very fine tubular pores; common moderately thick clay films on fragments and in pores; 20 percent cicada nodules; common fine lime veins; slightly calcareous; moderately alkaline; abrupt wavy boundary.

IIC1ca-28 to 36 inches; pale brown (10YR 6/3) loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; common very fine lime veins; slightly calcareous; moderately alkaline; gradual smooth boundary.

IIC2ca-36 to 61 inches; very pale brown (10YR 7/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common large masses of strongly calcareous segregated lime; moderately alkaline; gradual wavy boundary.

IIC3ca-61 to 65 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; slightly calcareous; moderately alkaline; clear smooth boundary.

IIIB2tbca-65 to 75 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; strong fine angular blocky structure; very hard, firm, sticky and plastic; slightly calcareous; strongly alkaline.

The A2 horizon is grayish brown, light brownish gray, or pale brown.

The B horizon is silty clay, clay loam, or clay. Most profiles contain a buried Bt horizon.

The Cca horizon is loam, fine sandy loam, or sandy loam. It is slightly or moderately calcareous.

Bedrock is mainly at a depth of more than 60 inches; however, in some pedons, it is at a depth of 40 to 60 inches. If the soil is underlain by bedrock or if it is near Rock outcrop, the entire profile is about 5 percent basalt cobbles, and the surface cover is about 0.1 percent stones.

Chilcott series

The Chilcott series consists of well drained soils that are moderately deep to a duripan. These soils formed in loess or silty alluvium that is underlain by mixed alluvium or basalt. They are on high alluvial terraces and basalt plains and have slopes of 0 to 8 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Chilcott soils are near Bowns, Chardoton, Colthorp, Elijah, Feltham, Jenness, Kunaton, McCain, Power, Purdam, Ridenbaugh, Sebree, Tenmile, and Trevino soils. Unlike Chilcott soils, Bowns soils do not have a duripan. Chardoton soils are very deep. Colthorp, Elijah, Feltham, McCain, Power, Purdam, and Sebree soils are

less than 35 percent clay in the argillic horizon. Feltham soils are sandy, and they do not have an argillic horizon. Jenness soils do not have an argillic horizon. Kunaton and Ridenbaugh soils have a duripan at a depth of less than 20 inches. Trevino soils do not have an argillic horizon, and they are less than 20 inches deep to bedrock.

Typical pedon of Chilcott silt loam, 0 to 2 percent slopes, about 4 miles south and 6 miles east of Kuna, approximately 825 feet south and 410 feet west of the NE cor. of the SE1/4 of sec. 13, T. 2 N., R. 1 E.

A21-0 to 5 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and many very fine roots; common fine vesicular and few tubular pores; mildly alkaline; gradual smooth boundary.

A22-5 to 9 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; mildly alkaline; clear wavy boundary.

B2t-9 to 15 inches; brown (7.5YR 5/4) silty clay, dark brown (10YR 4/3) moist; strong coarse prismatic structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; few moderately thick clay films on peds and in pores; mildly alkaline; abrupt wavy boundary.

C1ca-15 to 26 inches; very pale brown (10YR 7/4) loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; common very fine tubular pores; moderately calcareous; 2 percent cemented nodules; moderately alkaline; clear wavy boundary.

C2sicam-26 to 35 inches; very pale brown (10YR 7/4) duripan, brown (7.5YR 5/4) moist; thin indurated laminar layers with weakly cemented loam matrix below; moderately calcareous; strongly alkaline; clear wavy boundary.

C3ca-35 to 47 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; strongly calcareous; few pieces of hardpan; very strongly alkaline; gradual wavy boundary.

IIC4-47 to 65 inches; variegated coarse sand, single grain; loose; less than 15 percent, by weight, fine gravel; moderately alkaline.

The A horizon is dark brown, brown, very pale brown, pale brown, or light yellowish brown. It is darker than 5.5 dry and 3.5 moist. In some pedons, about 0.1 percent of the surface is covered with stones.

The B horizon is light yellowish brown, brownish yellow, brown, yellowish brown, or pale brown clay loam, silty clay loam, or silty clay.

The C horizon is white, light gray, very pale brown, pale brown, light yellowish brown, brownish yellow, or variegated. The texture is loam, sandy loam, coarse sand, or sand and gravel.

The duripan is at a depth of 20 to 40 inches. It is typically underlain by moderately coarse or coarse textured alluvium; but, in some pedons, it is underlain by basalt at a depth of 40 to 60 inches.

In some pedons, basalt cobbles and stones cover 3 to 5 percent of the surface.

Colthorp series

The Colthorp series consists of well drained soils that are shallow to a duripan. These soils formed in loess or silty alluvium that is underlain by basalt. They are on basalt plains and have slopes of 0 to 4 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Colthorp soils are similar to Pipeline soils. They are near Abo, Chilcott, Elijah, Kunaton, McCain, Power, Purdam, Ridenbaugh, and Sebree soils. Unlike Colthorp soils, Pipeline soils are not underlain by bedrock at a depth of 20 to 40 inches. Abo and Power soils are 60 or more inches deep. Chilcott, Elijah, McCain, Purdam, and Sebree soils are 20 to 40 inches deep. Kunaton and Ridenbaugh soils are more than 35 percent clay in the control section.

Typical pedon of Colthorp silt loam, 0 to 2 percent slopes, about 5 1/2 miles south of Boise Municipal Airport, approximately 275 feet north and 385 feet east of the SW cor. of the SW1/4 of sec. 28, T. 1 N., R. 1 E.

A1-0 to 4 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak very thin and thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; common very fine and fine interstitial and common very fine tubular pores; mildly alkaline; abrupt smooth boundary.

B2t-4 to 8 inches; brown (10YR 5/3) silty clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure parting to moderate very fine angular blocky; hard, friable, sticky and plastic; common very fine and fine and few medium roots; many very fine and few fine tubular and interstitial pores; common thin clay films on peds and in pores; neutral; abrupt smooth boundary.

C1-8 to 13 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; many very fine and medium tubular and interstitial pores; mildly alkaline; abrupt smooth boundary.

C2ca-13 to 19 inches; very pale brown (10YR 7/3) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly

plastic; common very fine and few fine and medium roots; few very fine and medium tubular pores; 10 percent durinodes; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C3casim-19 to 28 inches; white (10YR 8/2) duripan, very pale brown (10YR 8/3) moist; duripan occurs in thick indurated plates; root mat is on surface of duripan; strongly effervescent; strongly alkaline; abrupt wavy boundary.

IIR-28 inches; highly jointed and fractured basalt that has lime coatings on the surface and in cracks.

The A horizon is light gray or pale brown.

The B horizon is brown and yellowish brown silt loam or silty clay loam.

The C horizon above the pan is pale brown, white, light yellowish brown, or very pale brown loam or silt loam. The duripan is at a depth of 10 to 20 inches. Typically, it is underlain by basalt at a depth of 20 to 40 inches.

Cobbles and stones cover as much as 20 percent of the surface. Rock fragments make up as much as 25 percent of the profile.

Day series

The Day series consists of very deep, well drained soils. These soils formed in sediments that derived from volcanic ash and tuff. They are on terraces and have slopes of 5 to 30 percent. The average annual precipitation is 14 inches, and the average annual temperature is 49 degrees F.

Day soils are similar to Peasley soils. They are near Ada, Brent, Gem, Ladd, Searles, and Tenmile soils. These soils are less than 60 percent clay in the control section.

Typical pedon of Day clay, 15 to 30 percent slopes, about 4 miles east of Boise, approximately 630 feet south and 470 feet east of the NW cor. of the SW1/4 of sec. 21, T. 4 N., R. 3 E.

A1-0 to 5 inches; reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/4) moist; strong very fine and fine granular structure; soft, very friable, very sticky and very plastic; common very fine and fine roots; common very fine and fine interstitial pores; mildly alkaline; clear smooth boundary.

AC1-5 to 20 inches; dark reddish gray (5YR 4/2) clay, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure parting to fine and medium wedge-shaped peds; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine and fine tubular pores; common slickensides and pressure faces; moderately alkaline; gradual smooth boundary.

AC2-20 to 39 inches; dark reddish gray (5YR 4/2) clay, dark reddish brown (5YR 3/4) moist, many fine distinct black (5YR 2/1) stains on faces of peds; weak

coarse prismatic structure parting to fine and medium wedge-shaped peds; extremely hard, firm, very sticky and very plastic; few fine roots; few fine tubular pores; many pressure faces and slickensides with striations and grooves; strongly alkaline; gradual smooth boundary.

C1ca-39 to 50 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) moist; weak medium prismatic structure, parting to fine, medium, and coarse wedge-shaped peds; very hard, firm, sticky and very plastic; few fine roots; few very fine tubular pores; many pressure faces and slickensides with striations and grooves; common fine lime veins between peds; moderately calcareous; strongly alkaline; gradual smooth boundary.

C2ca-50 to 69 inches; reddish brown (5YR 5/3) silty clay, dark reddish brown (5YR 3/3) moist; massive; hard, firm, sticky and plastic; common coarse lime splotches on peds; moderately calcareous; moderately alkaline.

The A horizon is reddish brown or dark reddish gray. Vertical cracks, 2 to 3 inches wide at the surface, extend to a depth of 20 inches or more.

The AC horizon is dark reddish gray or reddish brown. In a few pedons, the lower part of the AC horizon is slightly or moderately calcareous.

The C horizon is reddish brown, dark reddish gray, or light reddish brown clay, silty clay, or sandy clay loam.

Drax series

The Drax series consists of very deep, moderately well drained soils that formed in dominantly acid igneous alluvium. These soils are on low terraces adjacent to the Boise River and other major drainages. They have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Drax soils are similar to Baldock, Goose Creek, and Harpt soils. They are near Beetville, Bissell, Jenness, Goose Creek, and Oliaga Variant soils. Baldock, Jenness, and Oliaga Variant soils do not have a mollic epipedon. Beetville soils are less than 18 percent clay in the control section. Bissell soils have an argillic horizon. Goose Creek soils have a mollic epipedon that is more than 20 inches thick. Harpt soils are well drained.

Typical pedon of Drax loam, approximately 740 feet south and 1,000 feet east of the NW cor. of the SW1/4 of sec. 19, T. 4 N., R. 2 E.

A11-0 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

A12-8 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; few medium and common very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

C1ca-12 to 17 inches; pale brown (10YR 6/3) heavy loam, dark brown (10YR 4/3) moist; few fine distinct dark brown (7.5YR 4/4) moist mottles; weak coarse subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; slightly calcareous; mildly alkaline; clear smooth boundary.

IIA1bca-17 to 24 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; common medium distinct dark yellowish brown (10YR 4/4) moist mottles; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; slightly calcareous; moderately alkaline; clear smooth boundary.

IIB2bca-24 to 28 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; common medium prominent strong brown (7.5YR 5/6) moist mottles; moderate medium prismatic structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; common fine lime veins between peds; moderately calcareous; strongly alkaline; gradual wavy boundary.

IIC2ca-28 to 45 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; common medium prominent strong brown (7.5YR 5/6) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; moderately calcareous; strongly alkaline; gradual wavy boundary.

IIC3-45 to 60 inches; light gray (10YR 7/2) sandy loam, grayish brown (10YR 5/2) moist; few large prominent strong brown (7.5YR 5/6) moist mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine tubular pores; mildly alkaline.

The A horizon is grayish brown, brown, or gray.

The C horizon is pale brown, light brownish gray, or light gray fine sandy loam to clay loam.

Most pedons contain buried A horizons that consist of grayish brown or gray fine sandy loam to silty clay loam. A few pedons contain buried B horizons that consist of pale brown or light brownish gray loam, clay loam, or silty clay loam. The control section is stratified with textures ranging from fine sandy loam to silty clay loam. The water table is at a depth of 48 to 72 inches at the peak of the irrigation season unless the soil is artificially drained.

Elijah series

The Elijah series consists of well drained soils that are moderately deep to a duripan. These soils formed in loess or silty alluvium that is underlain by mixed alluvium or basalt. They are on intermediate alluvial terraces and basalt plains and have slopes of 0 to 8 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Elijah soils are similar to Colthorp and Pipeline soils. They are near Colthorp, Pipeline, Power, Purdam, and Sebree soils. Unlike Elijah soils, Colthorp and Pipeline soils have a duripan at a depth of 10 to 20 inches. Power soils do not have a duripan. Purdam soils do not have an indurated duripan. Sebree soils have more than 15 percent sodium saturation.

Typical pedon of Elijah silt loam, 0 to 2 percent slopes, about 6 miles east of Meridian, approximately 380 feet south and 140 feet west of the NE cor. of the SW1/4 of sec. 14, T. 3 N., R. 1 E.

Ap-0 to 8 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

A12-8 to 11 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure parting to weak very fine subangular blocky; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; mildly alkaline; clear wavy boundary.

B21t-11 to 14 inches; yellowish brown (10YR 5/4) silty clay loam, brown (7.5YR 4/4) moist; weak fine prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and plastic; common very fine and fine and few medium roots; few very fine and fine tubular pores; common moderately thick clay films on peds and in pores; mildly alkaline; clear wavy boundary.

B22t-14 to 22 inches; brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4.4) moist; strong medium prismatic structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine and few medium roots between peds; few very fine tubular pores; continuous moderately thick clay films on peds and in pores; mildly alkaline; gradual wavy boundary.

B23t-22 to 26 inches; brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4.4) moist; weak medium prismatic structure, parting to moderate fine and medium angular blocky; hard, firm, sticky and plastic; common very fine and fine and few medium and coarse roots between peds; continuous moderately thick clay films on peds and in pores; moderately alkaline; gradual wavy boundary.

C1ca-26 to 31 inches; very pale brown (10YR 7/3) loam, brown (7.5YR 5.4) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; slightly effervescent in matrix, strongly effervescent lime veins in cracks and pores; strongly alkaline; clear wavy boundary.

C2sicam-31 to 36 inches; light gray (10YR 6/2) duripan, light gray (10YR 7/2) moist; thin silica laminations on surface and silica stringers throughout; roots matted on duripan surface; strongly effervescent; strongly alkaline; abrupt smooth boundary.

IIC3sicam-36 to 43 inches; light gray (10YR 6/2) indurated duripan, light gray (10YR 7.2) moist; 20 percent pebbles cemented in the matrix of the duripan; strongly effervescent; strongly alkaline; clear smooth boundary.

IIC4ca-43 to 96 inches; variegated sand and gravel; 70 percent pebbles; pebbles in the upper part have lime pendants.

The A horizon is grayish brown, brown, light gray, pale brown, or very pale brown. It is darker than 5.5, dry, or 3.5, moist. The texture is loam or silt loam.

The B2t horizon is grayish brown, yellowish brown, brown, or pale brown silt loam or silty clay loam.

The C horizon above the duripan, is light gray, very pale brown, or white loam or silt loam. The duripan is at a depth of 20 to 40 inches. Typically it is underlain by sand and gravel, but in some pedons it is underlain by basalt.

Falk series

The Falk series consists of very deep, somewhat poorly drained soils. These soils formed in recent alluvium of dominantly acid igneous origin. They are on low alluvial terraces adjacent to the Boise River and have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Falk soils are similar to Chance, Moulton, Oliaga Variant, and Tindahay soils. They are near Baldock, Bram, Chance, Goose Creek, Moulton, Notus, and Tindahay soils. Unlike Falk soils, Chance soils are very poorly drained. Moulton soils are poorly drained and have a mollic epipedon. Oliaga Variant soils are calcareous throughout the A horizon and the upper part of the C horizon. Baldock, Bram, and Goose Creek soils do not have strongly contrasting particle-size classes in the control section. Notus soils are more than 35 percent coarse fragments throughout the control section. Tindahay soils are well drained.

Typical pedon of Falk fine sandy loam, about 2 1/2 miles southeast of Eagle, approximately 470 feet north and 275 feet west of the SE cor. of the SW1/4 of sec. 22, T. 4 N., R. 1 E.

A11-0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2)

moist; weak thin platy structure parting to weak fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

A12-3 to 8 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine tubular pores; neutral; clear smooth boundary.

C1-8 to 21 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many fine tubular pores; neutral; clear wavy boundary.

C2-21 to 26 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; common fine faint dark yellowish brown (10YR 4/4) moist mottles; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many fine tubular pores; about 5 percent gravel; neutral; clear wavy boundary.

IIC3-26 to 33 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark grayish brown (2.5Y 4/2) moist; common fine distinct dark yellowish brown (10YR 4/4) moist mottles; massive; loose, very friable, nonsticky and nonplastic; few very fine and fine roots; 40 percent pebbles; neutral; clear wavy boundary.

IIC4-33 to 60 inches: mottled very gravelly sand; single grain, loose; 50 percent gravel; neutral.

The A horizon is grayish brown, light brownish gray, or pale brown.

The C horizon in the upper part is pale brown, light brownish gray, or variegated fine sandy loam, sandy loam, or coarse sandy loam; faint to distinct mottles are between depths of 20 to 40 inches. In the lower part it is faintly mottled sand and gravel.

The water table is at a depth of 36 to 60 inches during the irrigation season.

Feltham series

The Feltham series consists of very deep, somewhat excessively drained soils that formed in wind-modified alluvium. These soils are on terraces and alluvial fans and have slopes of 0 to 12 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Feltham soils are similar to the Turbyfill soils. They are near Power, Purdam, and Turbyfill soils. Unlike Feltham soils, Turbyfill soils have a coarse-loamy control section. Power and Purdam soils have an argillic horizon.

Typical pedon of Feltham loamy sand, 3 to 12 percent slopes, about 2 miles northeast of Star, approximately 2,000 feet south and 1,200 feet east of the NW cor. of the NW1/4 of sec. 4, T. 4 N., R. 1 W.

A1-0 to 7 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; weak medium granular structure; loose; many very fine and fine roots; common very fine and fine interstitial pores; mildly alkaline; clear wavy boundary.

C1-7 to 15 inches; very pale brown (10YR 7/3) loamy sand, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and medium roots; many very fine and fine interstitial pores; mildly alkaline; clear wavy boundary.

C2ca-15 to 20 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; hard, friable, nonsticky and nonplastic; few medium roots; common medium interstitial pores; few fine distinct lime veins; slightly calcareous; mildly alkaline; abrupt wavy boundary.

C3ca-20 to 34 inches; very pale brown (10YR 7/4) fine sand, light yellowish brown (10YR 6/4) moist; single grain; loose; slightly calcareous; mildly alkaline.

C4-34 to 60 inches; very pale brown (10YR 7/4) fine sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; slightly calcareous; mildly alkaline.

The A horizon is light yellowish brown or very pale brown.

The C horizon is light yellowish brown or very pale brown.

In some pedons, the surface horizon consists of recent eolian deposits of single grain, loose sand.

Garbutt series

The Garbutt series consists of very deep, well drained soils. These soils formed in loess on basalt plains or in silty alluvium on fans. The slopes are 0 to 8 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Garbutt soils are similar to Scism soils. They are near Scism, Trio, Truesdale, and Turbyfill soils. Unlike Garbutt soils, Scism and Truesdale soils have a weakly cemented duripan at a depth of 20 to 40 inches. Trio soils have a weakly cemented duripan at a depth of 10 to 20 inches. Turbyfill soils are more than 15 percent very fine sand or coarser material between depths of 10 and 40 inches.

Typical pedon of Garbutt silt loam, 4 to 8 percent slopes, about 9 miles south and 5 miles west of Kuna, approximately 190 feet north and 385 feet east of the SW cor. of the NW1/4 of sec. 7, T. 1 S., R. 1 W.

A11-0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common medium roots; many very fine and fine vesicular pores; slightly calcareous; strongly alkaline; abrupt smooth boundary.

A12-3 to 8 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common medium roots; many very fine and common fine tubular pores; slightly calcareous; strongly alkaline; gradual smooth boundary.

C1ca-8 to 13 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; common fine and medium tubular pores; moderately calcareous; moderately alkaline; gradual smooth boundary.

C2ca-13 to 17 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine and medium roots; common fine and medium tubular pores; moderately calcareous; moderately alkaline; gradual smooth boundary.

C3ca-17 to 27 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few fine and medium roots; common fine and medium tubular pores; 15 percent strongly cemented durinodes; moderately calcareous; moderately alkaline; gradual smooth boundary.

C4ca-27 to 40 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly plastic, nonsticky and nonplastic; few fine and medium tubular pores; moderately calcareous; moderately alkaline; abrupt wavy boundary.

IIC5ca-40 to 60 inches; very pale brown (10YR 8/3) silt loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; few medium roots; few medium tubular pores; few thin colloid stains on mineral grains; moderately calcareous; moderately alkaline.

The A horizon is brown, grayish brown, or yellowish brown. It is not both darker than 5.5 dry and 3.5 moist.

The C horizon is very pale brown, light gray, light brownish gray, grayish brown, and light yellowish brown.

Gem series

The Gem series consists of moderately deep, well drained soils. These soils formed in material that weathered from basalt, tuff, and volcanic ash and that is covered by loess in some areas. They are on basalt plains and in areas where basalt outcrops on the Boise Front. The slopes are 2 to 40 percent. The average annual precipitation is 14 inches, and the average annual temperature is 50 degrees F.

Gem soils are similar to Bowns soils. They are near Ada, Brent, Day, Ladd, Lankbush, Searles, and Tenmile soils. Unlike Gem soils, Ada, Searles, and Tenmile soils are more than 35 percent gravel in the control section.

Bowns and Lankbush soils have an ochric epipedon. Brent and Ladd soils are more than 60 inches deep. Day soils are more than 60 percent clay in the control section.

Typical pedon of Gem gravelly clay loam, 4 to 12 percent slopes, about 100 feet southwest of the south end of the emergency spillway of Lucky Peak Dam, in the NE1/4SE1/4 of sec. 11, T. 2 N., R. 3 E.

A11-0 to 2 inches; brown (10YR 4/3) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent weathered basalt pebbles; mildly alkaline; clear smooth boundary.

A12-2 to 7 inches; dark brown (7.5YR 4/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; many very fine tubular and interstitial pores; 20 percent weathered fine basalt pebbles; mildly alkaline; clear smooth boundary.

B21t-7 to 9 inches; dark grayish brown (10YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine and medium angular blocky; slightly hard, friable, sticky and plastic; common very fine roots dominantly confined to spaces between peds; few very fine tubular pores; 5 percent fine basalt pebbles; common moderately thick clay films on peds and in pores; moderately alkaline; clear smooth boundary.

B22t-9 to 15 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate thick platy structure parting to strong fine and medium angular blocky; hard, firm, very sticky and very plastic; common very fine and fine roots confined to spaces between peds; few very fine tubular pores; few thin clay films on peds; moderately alkaline; clear wavy boundary.

B3tca-15 to 18 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 3/3) moist; strong medium angular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; few slightly calcareous fine lime veins and splotches between peds; moderately alkaline; gradual wavy boundary.

Cca-18 to 23 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; about 20 percent weathered basalt pebbles; strongly calcareous; strongly alkaline; abrupt wavy boundary.

R-23 inches; vesicular basalt that has numerous joints and fractures; continuous lime coatings on upper surface; many cracks and pores are filled with secondary silica; few very fine and fine roots in soil material in cracks.

The Bt horizon is clay loam, clay, or gravelly silty clay loam.

In some pedons there is no Cca horizon.

Bedrock is at a depth of 20 to 40 inches. The profile is as much as 20 percent basalt gravel and 10 percent stones throughout. Gravel, cobbles, and stones, combined, make up less than 35 percent of the profile.

Goose Creek series

The Goose Creek series consists of very deep, somewhat poorly drained soils. These soils formed from acid igneous alluvium. They are on low alluvial terraces and have slopes of 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Goose Creek soils are similar to Bissell, Drax, and Harpt soils. They are near Baldock, Beetville, Bram, Drax, Falk, and Moulton soils. Unlike Goose Creek soils, Bissell soils have an argillic horizon. Baldock, Bram, and Falk soils do not have a mollic epipedon. Drax soils have a mollic epipedon. Harpt soils are well drained. Beetville and Moulton soils are less than 18 percent clay in the control section.

Typical pedon of Goose Creek loam, in northwest Boise, approximately 990 feet north and 1,350 feet east of the SW cor. of the NW1/4 of sec. 33, T. 4 N., R. 2 E.

A11-0 to 9 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate medium granular structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; neutral; clear smooth boundary.

A12-9 to 14 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; clear smooth boundary.

A13-14 to 20 inches; dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; weak coarse prismatic structure parting to moderate coarse subangular blocky; hard, firm, sticky and plastic; few very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; gradual smooth boundary.

C1-20 to 24 inches; dark gray (10YR 4/1) heavy loam, black (10YR 2/1) moist; weak coarse prismatic structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; mildly alkaline; gradual smooth boundary.

C2-24 to 29 inches; gray (10YR 5/1) heavy loam, black (10YR 2/1) moist; weak coarse prismatic structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine and fine interstitial and tubular pores; neutral; gradual smooth boundary.

C3ca-29 to 37 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few fine

prominent reddish brown (5YR 4/4) moist mottles; massive; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; common fine lime veins; slightly calcareous; mildly alkaline; gradual smooth boundary.

C4-37 to 60 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; many medium prominent reddish brown (5YR 5/3) moist mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; neutral.

The A horizon is dark gray, gray, or grayish brown.

The C horizon is dark gray, gray, grayish brown, or light brownish gray.

Mottles occur at a depth of 20 to 40 inches. The water table is at a depth of 30 to 40 inches at the peak of the irrigation season unless the soil is artificially drained. Many pedons contain a buried Al horizon. Some pedons contain a cambic horizon that is clay loam or sandy clay loam.

Harpt series

The Harpt series consists of very deep, well drained soils. These soils formed in acid igneous alluvium on alluvial fans and low alluvial terraces. The slopes are 0 to 4 percent. The average annual precipitation is 12 inches, and the average annual temperature is 51 degrees F.

Harpt soils are similar to Bissell, Cashmere, Drax, and Goose Creek soils. They are near Cashmere, Haw, Jenness, Lankbush, and Payette soils. Unlike Harpt soils, Lankbush and Jenness soils do not have a mollic epipedon. Bissell and Haw soils have an argillic horizon. Cashmere and Payette soils are less than 18 percent clay in the control section. Drax soils are moderately well drained, and Goose Creek soils are somewhat poorly drained.

Typical pedon of Harpt loam, 0 to 2 percent slopes, about 5 miles north of Star, along Willow Creek, approximately 880 feet north and 110 feet east of the SW cor. of the SE1/4 of sec. 18, T. 5 N., R. 1 W.

A11-0 to 3 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; weak thin platy structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

A12-3 to 14 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft and very friable; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

A13-14 to 22 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak

medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; gradual wavy boundary.

B2-22 to 36 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral; gradual wavy boundary.

C1-36 to 42 inches; pale brown (10YR 6/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; neutral; clear wavy boundary.

C2-42 to 63 inches; light brownish gray (10YR 6/2) coarse sandy loam; dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; mildly alkaline.

The B horizon is brown or pale brown silt loam, loam, or clay loam.

The profile is commonly stratified.

Haw series

The Haw series consists of very deep, well drained soils. These soils formed in acid igneous alluvium on alluvial terraces. The slopes are 4 to 60 percent. The average annual precipitation is 12 inches, and the average annual temperature is 50 degrees F.

Haw soils are similar to Bissell, Harpt, Ladd, Lankbush, Payette, and Van Dusen soils. They are near Brent, Cashmere, Harpt, Jenness, Lankbush, Payette, Tindahay, and Van Dusen soils. Unlike Haw soils, Bissell and Ladd soils do not have an accumulation of lime in the profile. Harpt, Cashmere, and Jenness soils do not have an argillic horizon. Brent and Lankbush soils do not have a mollic epipedon. Payette soils are less than 18 percent clay in the control section. Tindahay soils have a sandy control section. Van Dusen soils have a mollic epipedon that is more than 20 inches thick.

Typical pedon of Haw loam, 15 to 25 percent slopes, about 4 miles north and 1 1/2 miles east of Star, approximately 550 feet south and 660 feet west of the NE cor. of the NW1/4 of sec. 28, T. 5 N., R. 1 W.

A11-0 to 3 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

A12-3 to 7 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

A13-7 to 14 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; few very fine and fine tubular pores; neutral; clear wavy boundary.

B21t-14 to 23 inches; yellowish brown (10YR 5/4) clay loam, brown (10YR 4/3) moist; moderate medium and coarse prismatic structure; hard, firm, sticky and plastic; many very fine and fine roots; few very fine and common fine tubular pores; common moderately thick clay films on peds and in pores; mildly alkaline; abrupt wavy boundary.

B22tca-23 to 30 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few very fine and fine tubular pores; common moderately thick clay films on peds and in pores; few medium lime veins and splotches; moderately calcareous; moderately alkaline; abrupt wavy boundary.

C1ca-30 to 38 inches; light gray (10YR 7/2) loam, very pale brown (10YR 7/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine tubular pores; strongly calcareous; moderately alkaline; gradual wavy boundary.

IIC2ca-38 to 48 inches; light gray (10YR 7/2) loamy sand, pale brown (10YR 6/3) moist; massive; hard, firm, nonsticky and nonplastic; very weak lime cementation; strongly calcareous; moderately alkaline; abrupt wavy boundary.

IIC3ca-48 to 64 inches; white (10YR 8/2) loamy sand, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; strongly calcareous; strongly alkaline.

The A horizon is brown or grayish brown.

The B2t horizon is yellowish brown or light yellowish brown clay loam or sandy clay loam.

The C horizon is light gray, brownish yellow, very pale brown, or white loam, loamy sand, or sandy loam.

Jenness series

The Jenness series consists of very deep, well drained soils. These soils formed in acid igneous alluvium on alluvial fans and low alluvial terraces. The slopes are 0 to 4 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Jenness soils are similar to Cashmere, Falk, and Tindahay soils. They are near Brent, Cashmere, Chilcott, Elijah, Power, and Purdam soils. Unlike Jenness soils, Falk and Tindahay soils have contrasting textures in the control section. Cashmere soils have a mollic epipedon. Brent, Chilcott, Elijah, Power, and Purdam soils have an argillic horizon.

Typical pedon of Jenness fine sandy loam, 0 to 2 percent slopes, about 5 miles north of Star, approximate-

ly 800 feet south and 1,200 feet east of the NW cor. of the SW1/4 of sec. 15, T. 5 N., R. 1 W.

A1-0 to 9 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine and medium interstitial pores; neutral; abrupt wavy boundary.

C1-9 to 22 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine platy structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine and medium tubular pores; neutral; abrupt wavy boundary.

C2-22 to 32 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; common fine tubular pores; neutral; clear wavy boundary.

C3-32 to 40 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; common fine tubular pores; neutral; clear wavy boundary.

C4ca-40 to 53 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few fine tubular pores; slightly calcareous; mildly alkaline; clear wavy boundary.

II C5ca-53 to 70 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine tubular pores; few faint lime veins and splotches; moderately calcareous; mildly alkaline.

The A horizon is grayish brown, light brownish gray, light yellowish brown, and pale brown fine sandy loam or loam.

The C horizon is light brownish gray, grayish brown, pale brown, and very pale brown.

In some pedons, horizons below a depth of 40 inches have strongly contrasting textures. Most pedons have a slightly calcareous Cca horizon; some pedons are noncalcareous throughout.

Kiesel Variant

The Kiesel Variant consists of very deep, well drained sodium-affected soils. These soils formed in silty alluvium. They are on terraces and in filled basins on basalt plains. The slopes are 0 to 2 percent. The average annual precipitation is 12 inches, and the average annual temperature is 52 degrees F.

Kiesel Variant soils are similar to Chardoton and Sebree soils. They are near Chardoton and Lankbush

soils. Unlike Kiesel Variant soils, Chardoton soils do not have a natric horizon. Lankbush soils are less than 35 percent clay in the control section. Sebree soils have a duripan at a depth of 20 to 40 inches, and they are less than 35 percent clay in the control section.

Typical pedon of Kiesel Variant silty clay loam, 0 to 2 percent slopes, about 4 miles south of Orchard, 250 feet north and 50 feet east of the SW cor. of sec. 8, T. 2 S., R. 4 E.

A2-0 to 3 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) moist; moderate thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine and medium vesicular pores; neutral; abrupt smooth boundary.

B21t-3 to 7 inches; dark yellowish brown (10YR 4/4) clay, (10YR 3/4) moist; light yellowish brown (10YR 6/4) silt caps on upper surface of peds and coatings in cracks, dark brown (10YR 4/3) moist; strong medium columnar structure parting to moderate medium subangular blocky; hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores in the major portion of the peds with common fine vesicular pores in the silt caps; continuous thick clay films on the peds and in pores; moderately alkaline; abrupt smooth boundary.

B22t-7 to 11 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 3/4) moist; common distinct fine and medium very dark brown (10YR 2/2) organic stains on peds; moderate medium subangular blocky structure parting to strong very fine and fine angular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine and fine tubular pores; many moderately thick clay films on peds and in pores; strongly alkaline; clear smooth boundary.

B23t-11 to 16 inches; yellowish brown (10YR 5/4) silty clay, dark brown (7.5YR 4/4) moist; strong fine and medium angular blocky structure; hard, firm, sticky and plastic; common very fine roots; common very fine and fine tubular pores; 5 percent hard cicada nodules; common moderately thick clay films on peds and in pores; strongly alkaline; clear smooth boundary.

B3t-16 to 18 inches; light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; common very fine and fine tubular pores; 20 percent hard cicada nodules; few thin clay films on peds and in pores; strongly alkaline; clear smooth boundary.

C1ca-18 to 22 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine tubular pores; 15 percent hard cicada nodules; slightly calcareous matrix with common fine

strongly calcareous lime veins; strongly alkaline; clear smooth boundary.

C2ca-22 to 29 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine tubular pores; slightly calcareous matrix with many fine strongly calcareous lime veins; strongly alkaline; gradual smooth boundary.

IIB21tbca-29 to 37 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; moderate medium angular blocky structure; slightly hard, friable, slightly plastic; many very fine and fine tubular pores; few thin clay films; few slightly calcareous lime veins and splotches; strongly alkaline; gradual smooth boundary.

IIB22tbca-37 to 64 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate fine angular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine tubular pores; few thin clay films on faces of peds and in pores; few fine slightly calcareous lime veins; moderately alkaline.

The A2 horizon is light yellowish brown or pale brown.

The Bt horizon is clay, silty clay, silty clay loam, or clay loam. Exchangeable sodium makes up more than 15 percent of the B2t horizon in the upper part.

The B3t horizon is light yellowish brown or pale brown clay loam or loam. In a few pedons, this horizon is slightly or moderately calcareous.

The Cca horizon is very pale brown or pale brown and slightly to strongly calcareous. The texture is loam, silt loam, or very fine sandy loam.

The buried Bt horizon is loam or light clay loam. This horizon is massive but shows evidence of structure that was altered when the soil material was buried. In a few pedons the buried horizon is not present, or it is at a depth of 60 inches or more.

Kunaton series

The Kunaton series consists of well drained soils that are shallow to a duripan. These soils formed in loess or silty alluvium over basalt. They are on basalt plains and have slopes of 0 to 8 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Kunaton soils are similar to Ridenbaugh soils. They are near Chilcott, Colthorp, Elijah, Purdam, Ridenbaugh and Sebree soils. Unlike Kunaton soils, Ridenbaugh soils are not underlain by bedrock at a depth of less than 40 inches. Chilcott, Elijah, Purdam, and Sebree soils have a duripan at a depth of 20 to 40 inches. Colthorp soils are less than 35 percent clay in the control section.

Typical pedon of Kunaton silty clay loam, 0 to 2 percent slopes, about 4 3/4 miles east of Kuna, approximately 80 feet south and 1,070 feet east of the NW cor. of sec. 27, T. 2 N., R. 1 E.

A2-0 to 4 inches; pale brown (10YR 6/3) silty clay loam, dark yellowish brown (10YR 4/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine vesicular pores; mildly alkaline; abrupt smooth boundary.

B2t-4 to 9 inches; brown (7.5YR 5/4) silty clay, dark brown (7.5YR 4/4) moist; dark brown (7.5YR 4/4) moist or dry coatings on peds; moderate very coarse prismatic structure parting to strong medium subangular blocky and fine angular blocky; very hard, friable, sticky and plastic; common very fine roots; many very fine and fine tubular pores; continuous thick clay films on peds and in pores; mildly alkaline; clear smooth boundary.

B3tca-9 to 13 inches; very pale brown (10YR 7/3) silty clay, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine and fine tubular pores; many moderately thick clay films on peds and in pores; common fine lime veins between peds; moderately calcareous; strongly alkaline; abrupt smooth boundary.

Ccasim-13 to 25 inches; very pale brown (10YR 7/4) duripan, light yellowish brown (10YR 6/4) moist; white (10YR 8/2) lime coatings covering the indurated laminations; dense opalized layer 3 to 6 millimeters thick on upper zone of cementation; laminations are 1 to 3 inches thick, separated by 0.5 inch to 2.0 inches of loose, strongly calcareous soil material; strongly alkaline; abrupt wavy boundary.

IIR-25 inches; highly jointed and fractured vesicular basalt.

The A horizon is pale brown or dark grayish brown.

The Bt horizon is brown, dark yellowish brown, or light yellowish brown silty clay, clay, or silty clay loam. The B2t horizon is typically noncalcareous; but, in some pedons, fine lime veins occur between the peds.

The control section is, by weighted average, 38 to 55 percent clay. The duripan is at a depth of 10 to 20 inches. Typically, it rests directly on basalt at a depth of 20 to 40 inches.

Ladd series

The Ladd series consists of very deep, well drained soils that formed in weathered granite or granitic colluvium. They are on colluvial mountain foot slopes. The slopes are 4 to 65 percent. The average annual precipitation is 16 inches, and the average annual temperature is 50 degrees F.

Ladd soils are near Ada, Brent, Day, Gem, Haw, Lankbush, Ola, Payette, Rainey, Searles, Tenmile, and Van Dusen soils. Unlike Ladd soils, Ada, Searles, and Tenmile soils are more than 35 percent rock fragments in the control section. Brent, Day, and Gem soils are more

than 35 percent clay in the control section. Haw soils have accumulations of lime in the profile. Lankbush soils do not have a mollic epipedon. Payette and Rainey soils are less than 18 percent clay in the control section. Ola and Van Dusen soils have a mollic epipedon that is more than 20 inches thick.

Typical pedon of Ladd-loam, 4 to 15 percent slopes, about 1 1/2 miles northeast of Tablerock, approximately 1,000 feet north and 50 feet west of the SE cor. of sec. 7, T. 3 N., R. 3 E.

A11-0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; neutral; clear smooth boundary.

A12-5 to 14 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; neutral; clear smooth boundary.

B21t-14 to 29 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; continuous moderately thick clay films on peds; neutral; gradual smooth boundary.

B22t-29 to 45 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; continuous thin clay films on peds; neutral; gradual smooth boundary.

C-45 to 72 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine tubular pores; few thin clay films in pores; neutral.

Weathered granite is typically at a depth of 60 inches or more. The profile is slightly acid to mildly alkaline throughout. Some pedons are as much as 15 percent fine gravel.

The A horizon is grayish brown or gray.

The B2t horizon is light yellowish brown, pale brown, or brown sandy clay loam or clay loam.

The C horizon ranges in texture from sandy clay loam to sandy loam.

Lankbush series

The Lankbush series consists of very deep, well drained soils. These soils formed in acid igneous alluvial or lacustrine deposits. In some areas, these soils are on alluvial fans and alluvial terraces and have slopes of 0 to

80 percent. The average annual precipitation is 12 inches, and the average annual temperature is 51 degrees F.

Lankbush soils are similar to the Brent, Payette, and Haw soils. They are near Brent, Cashmere, Chardoton, Gem, Haw, Payette, Tindahay, and Van Dusen soils. Unlike Lankbush soils, Brent, Gem, Haw, Payette and Van Dusen soils have a mollic epipedon. Tindahay soils do not have an argillic horizon. Brent and Chardoton soils are more than 35 percent clay in the control section.

Typical pedon of Lankbush sandy loam in an area of Lankbush-Brent sandy loamy, 12 to 30 percent slopes, about 4 miles north and 1 1/2 miles east of Star, approximately 5,220 feet north and 880 feet west of the SE cor. of the NW1/4 of sec. 28, T. 5 N., R. 1 W.

A1-0 to 4 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

A2-4 to 11 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots, many very fine, common fine, and few medium tubular pores; neutral; abrupt wavy boundary.

B21t-11 to 19 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to strong medium subangular blocky; extremely hard, very firm, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; thick continuous clay films on peds and in pores; mildly alkaline; abrupt wavy boundary.

B22t-19 to 30 inches; pale brown (10YR 6/3) loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; few thin clay films in pores; mildly alkaline; clear wavy boundary.

C1-30 to 41 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine tubular pores; mildly alkaline; abrupt wavy boundary.

C2ca-41 to 60 inches; very pale brown (10YR 7/3) sandy loam, pale brown (10YR 6/3) moist; massive; very hard, very firm, nonsticky and nonplastic; few lime veins; moderately calcareous; strongly alkaline.

The A horizon is grayish brown, brown, or pale brown. It is not thick enough or dark enough to be a mollic epipedon. The A2 horizon is loam or sandy loam.

The B2t horizon is grayish brown, brown, yellowish brown, or light yellowish brown sandy clay loam, clay loam, or loam.

The C horizon is pale brown, very pale brown, or light gray sandy loam, loamy coarse sand, or coarse sand.

Some pedons are 5 to 10 percent fine gravel throughout. Some pedons do not have a C2ca horizon.

McCain series

The McCain series consists of moderately deep, well drained soils. These soils formed in loess or silty alluvium that is underlain by basalt. They are on basalt plains and have slopes of 0 to 15 percent. The average annual precipitation is 10 inches, and the average annual temperature is 51 degrees F.

McCain soils are similar to Power soils. They are near Chilcott, Colthorp, Elijah, Kunaton, Potratz, Power, Scism, Sebree, and Trevino soils. Unlike McCain soils, Chilcott, Elijah, and Sebree soils have an indurated duripan at a depth of 20 to 40 inches. Power soils are more than 40 inches deep. Potratz soils do not have an argillic horizon. Scism soils have a weakly cemented duripan at a depth of 20 to 40 inches. Colthorp, Kunaton, and Trevino soils are less than 20 inches deep.

Typical pedon of McCain silt loam, 4 to 8 percent slopes, about 3 miles south of Kuna, approximately 670 feet north and 1,100 feet east of the SW cor. of the NE1/4 of sec. 20, T. 1 N., R. 1 W.

A1-0 to 2 inches; brown (10YR 5/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; neutral; clear smooth boundary.

A2-2 to 7 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate thin platy structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; many fine vesicular pores; neutral; abrupt smooth boundary.

B21t-7 to 12 inches; brown (10YR 5/3) silty clay loam, yellowish brown (10YR 5/4) moist; dark brown (10YR 4/3) moist crushed; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; few fine and medium roots; many fine tubular pores; nearly continuous thin clay films on the vertical and horizontal faces of peds; moderately alkaline; clear smooth boundary.

B22t-12 to 16 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; common fine and medium roots; many fine tubular pores; continuous thin clay films on vertical and horizontal faces of peds; moderately alkaline; gradual wavy boundary.

B3ca-16 to 22 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; few thin clay films on

faces of peds; common fine lime veins between peds; slightly calcareous; moderately alkaline; clear smooth boundary.

C1ca-22 to 29 inches; white (10YR 8/2) loam, very pale brown (10YR 7/3) moist; massive; slightly hard, friable; few very fine and fine roots; common fine tubular pores; 5 percent angular basaltic pebbles; 20 to 30 percent strongly cemented cicada nodules; strongly calcareous; moderately alkaline; gradual smooth boundary.

C2ca-29 to 33 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable; 10 percent angular basaltic stones and pebbles; 20 to 30 percent strongly cemented cicada nodules; strongly calcareous; moderately alkaline; abrupt wavy boundary.

R-33 inches; basalt; lime coating on upper surface and in pores and fractures.

The A horizon is not both darker than 5.5 dry and 3.5 moist.

In some pedons the C horizon is 10 to 30 percent strongly cemented cicada nodules.

Bedrock is at a depth of 20 to 40 inches. In some pedons the surface cover is as much as 15 percent stones and the profile is as much as 15 percent stones and 10 percent gravel.

Minidoka series

The Minidoka series consists of well drained soils that are moderately deep to a duripan that is underlain by basalt. These soils formed in loess or silty alluvium. They are on basalt plains and have slopes of 2 to 4 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Minidoka soils are similar to Scism soils. They are near Garbutt, Potratz, Scism, Shabliss, Trevino, Trio, and Truesdale soils. Unlike Minidoka soils, Garbutt and Potratz soils do not have a duripan. Scism and Truesdale soils have a brittle, weakly cemented duripan. Shabliss and Trio soils are 10 to 20 inches deep. Trevino soils are underlain by bedrock at a depth of 10 to 20 inches.

Typical pedon of Minidoka silt loam, bedrock substratum, 2 to 4 percent slopes, about 8 miles south of Kuna and 1 mile west of Swan Falls road, approximately 490 feet southwest of the NE1/4 of sec. 4, T. 1 N., R. 1 W.

A1-0 to 4 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine and medium roots; common medium tubular and interstitial pores; mildly alkaline; clear wavy boundary.

B2-4 to 11 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many

fine and common medium roots; common fine and medium tubular pores; moderately alkaline; gradual wavy boundary.

C1casi-11 to 24 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; very hard, very firm, slightly sticky and slightly plastic; few very fine and fine roots; common fine tubular pores; about 30 percent durinodes in a weakly cemented matrix with discontinuous silica stringer; strongly calcareous; moderately alkaline; abrupt smooth boundary.

C2sicam-24 to 41 inches; white (10YR 8/2) duripan, very pale brown (10YR 8/3) moist; alternating laminations 1 to 3 inches thick with loose soil material between plates; indurated; roots matted on pan surface; strongly calcareous; strongly alkaline; abrupt wavy boundary.

R-41 inches; highly jointed and fractured, vesicular basalt.

The A horizon is light yellowish brown or pale brown.

The C horizon is light gray and white silt loam or loam.

The duripan is at a depth of 20 to 40 inches. Typically, it is underlain by basalt at a depth of 40 to 60 inches.

Moulton series

The Moulton series consists of very deep, poorly drained soils. These soils formed in alluvium from acid igneous material. They are on the flood plain of the Boise River and on low alluvial terraces adjacent to the flood plain. The slopes are 0 to 2 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Moulton soils are similar to Chance, Falk, and Oliaga Variant soils. They are near Baldock, Beetville, Bissell, Bram, Chance, Falk, Goose Creek, and Notus soils. Unlike Moulton soils, Chance, Falk, Oliaga Variant, Baldock, Bram, and Notus soils do not have a mollic epipedon. Chance soils are very poorly drained. Bissell soils are more than 18 percent clay in the control section. Beetville and Goose Creek soils do not have strongly contrasting textures in the control section.

Typical pedon of Moulton fine sandy loam, about 1 1/2 miles south and 1 1/4 miles east of Eagle, approximately 960 feet south and 1,300 feet east of the NW cor. of the NW1/4 of sec. 22, T. 4 N., R. 1 W.

A11-0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; neutral; clear smooth boundary.

A12-6 to 12 inches; grayish brown (2.5Y 5.2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; few faint dark yellowish brown (10YR 4/4) moist mottles; weak medium subangular blocky structure;

slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; many very fine and fine tubular pores; mildly alkaline; clear wavy boundary.

B21-12 to 16 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; many medium distinct yellowish brown (10YR 5/6) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular pores; neutral; gradual wavy boundary.

B22-16 to 24 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; many medium distinct yellowish brown (10YR 5/6) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; many fine tubular pores; neutral; clear wavy boundary.

C1-24 to 33 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; many large distinct yellowish brown (10YR 5/6) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and medium roots; many fine tubular pores; neutral; abrupt wavy boundary.

IIC2-33 to 60 inches; grayish brown (2.5Y 5/2) very gravelly loamy sand, grayish brown (2.5Y 5/2) moist; many medium distinct light yellowish brown (2.5Y 6/4) moist mottles; single grain; loose; 40 percent pebbles; neutral.

The A horizon is grayish brown and dark grayish brown.

The B horizon is fine sandy loam or sandy loam.

The C horizon ranges from fine sandy loam in the upper part to loamy sand or sand and gravel in the lower part.

The seasonal water table is at a depth of 18 to 36 inches.

Notus series

The Notus series consists of very deep, somewhat poorly drained soils. These soils formed in acid igneous coarse-textured alluvium. They are on the flood plains of the Boise River and on adjacent low terraces. The slopes are 0 to 3 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Notus soils are near Baldock, Bissell, Bram, Chance, Falk, and Moulton soils. Unlike the Notus soils, these soils are less than 35 percent coarse fragments in the control section.

Typical pedon of Notus sandy loam, about 24 miles southeast of Star, approximately 360 feet south and 495 feet west of the NE cor. of the NW1/4 of sec. 22, T. 4 N., R. 1 W.

A1-0 to 2 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine interstitial and tubular pores; neutral; gradual smooth boundary.

C1-2 to 12 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; few medium prominent reddish brown (5YR 4/3) moist mottles; single grain; loose; few very fine and fine roots; 10 percent pebbles; neutral; clear smooth boundary.

IIC2-12 to 60 inches; very pale brown (10YR 7/3) very gravelly sand, very pale brown (10YR 7/3) moist; single grain; loose; 50 percent pebbles and 10 percent cobbles; neutral.

The A horizon is light brownish gray or pale brown. Cobbles cover 0 to 25 percent of the surface.

The C horizon is pale brown, very pale brown, or variegated. It is 40 to 90 percent gravel and 0 to 25 percent cobbles.

The water table is at a depth of 3 to 5 feet during the summer.

Ola series

The Ola series consists of moderately deep, well drained soils. These soils formed in material that weathered from granite. They are on the side slopes of mountains. The slopes are 15 to 80 percent. The average annual precipitation is 18 inches, and the average annual temperature is 45 degrees F.

Ola soils are similar to Rainey soils. They are near Ladd, Rainey, and Searles soils. Ladd and Searles soils have an argillic horizon. Rainey soils have a mollic epipedon that is less than 20 inches thick.

Typical pedon of Ola loam in an area of Ola-Searles complex, 15 to 30 percent slopes, about 1/2 mile south of Lucky Peak, approximately 660 feet north and 140 feet west of the SE cor. of the NE1/4 of sec. 14, T. 4 N., R. 3 E.

A11-0 to 11 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A12-11 to 21 inches; grayish brown (10YR 5/2) fine gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; medium coarse subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 20 percent fine pebbles; slightly acid; clear smooth boundary.

A3-21 to 28 inches; grayish brown (10YR 5/2) fine gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable,

slightly sticky and nonplastic; common fine roots; common fine tubular pores; 20 percent fine pebbles; slightly acid; clear smooth boundary.

C1-28 to 33 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 10 percent pebbles; slightly acid; clear wavy boundary.

C2-33 to 35 inches; very pale brown (10YR 8/3) fine gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 25 percent pebbles; neutral; clear wavy boundary.

Cr3-35 to 38 inches; highly fractured, partially decomposed granite; few fine roots in cracks; clear wavy boundary.

R-38 inches; unweathered granite.

The A horizon is very dark grayish brown, dark grayish brown, or grayish brown loam, sandy loam, or fine gravelly sandy loam.

The C horizon is grayish brown, brown, pale brown, or very pale brown loam, sandy loam, or fine gravelly sandy loam.

Bedrock is at a depth of 20 to 40 inches.

Oliaga Variant

The Oliaga Variant consists of very deep, somewhat poorly drained soils. These soils formed in mixed alluvium. They are on alluvial terraces and have slopes of 0 to 3 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Oliaga Variant soils are similar to Chance, Falk, Moulton, and Tindahay soils. They are near Abo, Drax, and Jenness soils. Unlike Oliaga Variant soils, Abo and Jenness soils do not have contrasting textures in the control section. Chance soils are very poorly drained. Tindahay soils are well drained. Falk soils do not contain lime in the surface layer. Moulton and Drax soils have a mollic epipedon.

Typical pedon of Oliaga Variant loam, about 5 miles southeast of Meridian, 200 feet north and 50 feet west of the SE cor. of the NE1/4SW1/4 of sec. 29, T. 3 N., R. 1 E.

A1ca-0 to 7 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many fine and medium roots; many very fine and fine tubular pores; about 10 percent fine pebbles; moderately calcareous; strongly alkaline; clear smooth boundary.

C1ca-7 to 15 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 3/4) moist; few fine distinct brown (7.5YR 4/4) moist mottles; weak fine subangular blocky structure; slightly hard, friable, slightly

sticky and slightly plastic; many fine and medium roots; many very fine and fine tubular pores; moderately calcareous; moderately alkaline; clear smooth boundary.

C2ca-15 to 21 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; few fine distinct dark yellowish brown (10YR 4/4) and common fine prominent dark reddish brown (5YR 2/2) moist mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine, fine, and medium tubular pores; 10 percent fine pebbles; slightly calcareous; mildly alkaline; clear smooth boundary.

C3ca-21 to 34 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; few fine distinct dark brown (10YR 4/4) moist mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many medium and coarse tubular pores; 10 percent fine pebbles; strongly calcareous; mildly alkaline; clear wavy boundary.

IIC4-34 to 45 inches; very pale brown (10YR 7/3) very gravelly loamy sand, light yellowish brown (10YR 6/4) moist; massive; loose; 45 percent fine pebbles; slightly acid; gradual wavy boundary.

IIC5-45 to 63 inches; variegated very gravelly coarse sand; single grain; loose, very friable; 45 percent fine pebbles.

The A1 horizon is light brownish gray or pale brown.

Faint to prominent mottles are at a depth of 7 to 20 inches. The water table is at a depth of 3 to 5 feet at the peak of the irrigation season. At times, the soil material is saturated to the surface.

Payette series

The Payette series consists of very deep, well drained soils. These soils formed in alluvium from acid igneous material. In some areas, they are covered by loess. Payette soils are on terraces and have slopes 15 to 65 percent. The average annual precipitation is 12 inches, and the average annual temperature is 50 degrees F.

Payette soils are similar to Cashmere, Haw, Lankbush, and Van Dusen soils. They are near Brent, Cashmere, Harpt, Haw, Lankbush, Quincy, Tindahay, and Van Dusen soils. Unlike Payette soils, Cashmere, Quincy, and Tindahay soils do not have an argillic horizon. Harpt, Haw, and Van Dusen soils are more than 18 percent clay in the argillic horizon. Brent and Lankbush soils do not have a mollic epipedon.

Typical pedon of Payette sandy loam in an area of Payette-Quincy complex, 30 to 65 percent slopes, about 3/4 mile southeast of Crane Creek Golf Course, approximately 930 feet west and 640 feet south of the NE cor. of the SE1/4 of sec. 26, T. 4 N., R. 2 E.

A11-0 to 12 inches; grayish brown (10YR 5/2) sandy loam, black (10YR 2/1) moist; weak medium subangular blocky structure parting to moderate very fine and fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A12-12 to 17 inches; grayish brown (10YR 5/2) sandy loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

B2t-17 to 30 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; common moderately thick clay films on faces of peds; neutral; gradual smooth boundary.

B3t-30 to 34 inches; yellowish brown (10YR 5/4) sandy loam, yellowish brown (10YR 5/4) moist; weak medium prismatic structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; few thin clay films on faces of peds; neutral; gradual smooth boundary.

C1ca-34 to 44 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable; few very fine and fine roots; common very fine and fine tubular pores; few fine lime veins; slightly calcareous; neutral; clear smooth boundary.

C2-44 to 64 inches; light gray (10YR 7/2) coarse sand, very pale brown (10YR 7/3) moist; massive; slightly hard, very friable; mildly alkaline.

The A horizon is grayish brown or brown.

The Bt horizon is brown, yellowish brown, or pale brown fine sandy loam, sandy loam, or coarse sandy loam.

The C horizon is pale brown, light yellowish brown, or light gray loamy coarse sand or coarse sand. It is slightly to moderately calcareous.

Peasley series

The Peasley series consists of well drained soils that are moderately deep to a duripan. These soils formed in a mantle of granitic alluvium or loess over basalt. They are on basalt plains and have slopes of 2 to 6 percent. The average annual precipitation is 14 inches, and the average annual temperature is 49 degrees F.

Peasley soils are similar to Chilcott and Day soils. They are near Bowns, Chilcott, Kunaton, and Sebree soils. Unlike Peasley soils, Bowns soils are underlain by basalt at a depth of 20 to 40 inches, and they do not

have a duripan. Chilcott and Kunaton soils do not have slickensides and vertical cracks that extend from the surface to a depth of more than 20 inches. Day soils are more than 40 inches deep, and they are more than 60 percent clay in the control section. Sebree soils have a natric horizon and are less than 35 percent clay in the control section.

Typical pedon of Peasley silty clay loam, 2 to 6 percent slopes, about 5 miles southeast of Lucky Peak Reservoir, approximately 1,155 feet south and 935 feet west of the NE cor. of sec. 4, T. 1 N., R. 4 E.

A11-0 to 3 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak medium granular structure; slightly hard, friable, sticky and plastic; common very fine roots; few very fine tubular pores; neutral; clear smooth boundary.

A12-3 to 7 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; strong medium granular structure; hard, friable, sticky and very plastic; few very fine roots; common very fine tubular pores; neutral; abrupt smooth boundary.

AC-7 to 16 inches; brown (10YR 5/3) silty clay, dark brown (10YR 3/3) moist; strong medium and coarse wedge-shaped peds in a near horizontal position; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; 5 percent fine granite and basalt pebbles; common pressure faces and many slickensides with striations on faces of large peds; neutral; gradual wavy boundary.

C1-16 to 21 inches; light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 4/4) moist; soil material sloughed in cracks is brown (10YR 5/3) silty clay, dark brown (10YR 3/3) moist; strong medium and coarse wedge-shaped peds inclined in a near horizontal position; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; 10 percent fine granite and basalt pebbles; common pressure faces and many slickensides with striations on faces of large peds; mildly alkaline; abrupt smooth boundary.

IIC2sim-21 to 35 inches; pale brown (10YR 6/3) weakly cemented duripan, brown (10YR 4/3) moist; common fine prominent very dark brown (10YR 2/2) mottles; massive pan occurs in plate-like laminations 0.5 inch to 1.0 inch thick with a smooth continuous coating of silica on the upper surface and an irregular lower surface with silica pendants; a root mat overlies the duripan; very hard; firm; few very thin weakly effervescent veins of lime and soluble salts; 20 percent fine granitic and basalt pebbles and 3 percent basalt stones; mildly alkaline; clear smooth boundary.

IIC3-35 to 42 inches; very pale brown (10YR 7/4) fine gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; common fine prominent very dark brown (10YR 2/2) mottles; massive; hard, firm; 20 percent fine granitic and basalt pebbles and 3 percent basalt stones; mildly alkaline; clear wavy boundary.

R-42 inches; highly jointed and fractured basalt.

The A1 horizon is brown or dark brown. The AC horizon is silty clay or clay.

The C1 horizon is pale brown or light yellowish brown, and it contains brown or dark brown soil material, which has accumulated in the cracks between peds as a result of churning activity in the pedon. Percent stones range from 0 to 10 percent and percent gravel ranges from 10 to 25 percent.

The solum is 15 to 22 inches thick. The weakly cemented duripan is at a depth of 20 to 40 inches. Basalt is at a depth of 40 to 60 inches deep. Vertical cracks, 2 to 3 inches wide at the surface, extend to the duripan. This cracking is concentrated between polygons, which are 10 to 12 inches across.

Pipeline series

The Pipeline series consists of well drained soils that are shallow to a duripan. These soils formed in loess or silty alluvium over coarse-textured alluvium. They are on alluvial terraces and have slopes of 0 to 12 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Pipeline soils are similar to the Colthorp soils. They are near Chilcott, Elijah, Purdam, and Sebree soils. Unlike Pipeline soils, Colthorp soils are underlain by basalt at a depth of less than 40 inches. Chilcott, Elijah, Purdam and Sebree soils have a duripan at a depth of 20 to 40 inches.

Typical pedon of Pipeline silt loam, 0 to 2 percent slopes, about 4 miles west of Boise Municipal Airport, approximately 770 feet south and 250 feet east of the NW cor. of sec. 26, T. 3 N., R. 1 E.

Ap-0 to 8 inches; brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; weak thin platy structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine and fine interstitial and tubular pores; neutral; clear smooth boundary.

B21t-8 to 12 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; many very fine roots; many very fine tubular pores; common thin clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B22t-12 to 14 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; 15 percent durinodes; common thin clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B3tca-14 to 16 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; few thin clay films on faces of peds and in pores; 20 percent durinodes; few strongly calcareous lime veins and splotches; moderately alkaline; clear smooth boundary.

C1ca-16 to 19 inches; very pale brown (10YR 8/3) silt loam, light yellowish brown (10YR 6/4) moist; massive; hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; 20 percent durinodes; strongly calcareous; moderately alkaline; abrupt wavy boundary.

C2casim-19 to 33 inches; white (10YR 8/2) duripan, very pale brown (10YR 8/3) moist; duripan occurs in indurated plate-like laminations 2 to 3 inches thick with a thin, continuous opalized surface and silica stringers throughout; dense root mat is on upper surface of duripan; strongly calcareous; strongly alkaline; abrupt wavy boundary.

IIC3ca-33 to 65 inches; variegated very gravelly sand; single grain; loose; 40 percent pebbles and 15 percent cobbles; strongly calcareous pendants on pebbles and cobbles; mildly alkaline.

The Ap or A1 horizon is brown, light brownish gray, or pale brown. The material in the upper 7 inches is not both darker than 5.5 dry and 3.5 moist.

The Bt horizon is, by weighted average, 20 to 30 percent clay and 7 to 15 percent fine sand or coarser material. The lower part of the Bt horizon is 0 to 20 percent durinodes.

The C1ca horizon is silt loam or loam and 5 to 25 percent durinodes. The Ccasim horizon is strongly or very strongly cemented, and it is at a depth of 10 to 20 inches. In some pedons, it is 5 to 15 percent gravel. The Cca horizon below the duripan is sand, loamy sand, or sandy loam in the fine earth fraction and is 5 to 45 percent gravel.

Potratz series

The Potratz series consists of moderately deep, well drained soils. These soils formed in loess on basalt plains. The slopes are 0 to 8 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Potratz soils are near the McCain, Minidoka, Power, Scism, Trevino, and Truesdale soils. Unlike Potratz soils, McCain and Power soils have an argillic horizon. Minidoka soils have an indurated duripan at a depth of 20 to 40 inches. Scism and Truesdale soils are deeper than 40 inches to bedrock. Trevino soils are less than 20 inches deep to basalt.

Typical pedon of Potratz silt loam, 4 to 8 percent slopes, about 2 miles south and 2 miles west of Kuna-

ton, approximately 55 feet north and 470 feet east of the SW cor. of the NE 1/4 of sec. 5, T. 1 N., R. 1 W.

A11-0 to 2 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; neutral; clear smooth boundary.

A12-2 to 5 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine vesicular pores; neutral; clear smooth boundary.

A3-5 to 10 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; moderately alkaline; clear smooth boundary.

B2t-10 to 19 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist, pale brown (10YR 6/3) crushed, yellowish brown (10YR 5/4) moist, crushed; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common fine tubular pores; few thin clay films in pores; moderately alkaline; abrupt wavy boundary.

C1ca-19 to 25 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular pores; few hard nodules; strongly calcareous; moderately alkaline; abrupt smooth boundary.

C2ca-25 to 32 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; massive; very hard, very firm; few fine and medium roots; few fine and medium tubular pores; 15 percent weakly cemented durinodes; strongly calcareous; moderately alkaline; clear wavy boundary.

C3ca-32 to 38 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; moderately alkaline; abrupt wavy boundary.

IIR-38 inches; basalt with 1 to 2 inches of strongly cemented lime coating on upper surface.

The A horizon is light brownish gray, brown, or pale brown. It is not both darker than 5.5 dry and 3.5 moist.

The B horizon is silt loam or loam that is yellowish brown or pale brown if crushed.

The C horizon is white, light gray, or very pale brown silt, silt loam, or loam. It may contain thin, moderately or strongly cemented layers. The C horizon is 0 to 10 percent moderately or strongly cemented nodules and 0 to 5 percent basalt stones.

Bedrock is at a depth of 20 to 40 inches. In some pedons, stones cover about 5 percent of the surface.

Power series

The Power series consists of very deep, well drained soils. These soils formed in loess or silty alluvium that is underlain by mixed alluvium. They are on low alluvial terraces and basalt plains and have slopes of 0 to 12 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Power soils are similar to the McCain soils. They are near Abo, Colthorp, Elijah, McCain, Potratz, Scism, and Sebree soils. Unlike Power soils, Abo soils are somewhat poorly drained. Colthorp soils have a duripan at a depth of 10 to 20 inches. Elijah, McCain, Potratz, Sebree, and Scism soils are 20 to 40 inches deep.

Typical pedon of Power silt loam, 2 to 4 percent slopes, about 3 miles south of Kuna, approximately 1,180 feet east and 1,620 feet south of the NW cor. of sec. 12, T. 1 N., R. 1 W.

A11-0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; neutral; clear smooth boundary.

A12-3 to 6 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak medium platy structure parting to moderate thin platy; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine tubular pores; neutral; clear smooth boundary.

B1-6 to 9 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots between peds, few very fine roots within peds; many medium interstitial and common very fine tubular pores; neutral; clear smooth boundary.

B21t-9 to 19 inches; yellowish brown (10YR 5/4) silty clay loam, dark brown (7.5YR 4/2) moist; strong medium prismatic structure parting to strong medium subangular blocky; very hard, very firm, sticky and plastic; common fine and few very fine roots; common fine tubular pores; common moderately thick clay films on faces of peds and in pores; organic stains on peds; moderately alkaline; clear smooth boundary.

B22tca-19 to 27 inches; light yellowish brown (10YR 6/4) silty clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; very hard, very firm, slightly sticky and slightly plastic; common fine and few very fine roots; few medium interstitial and common very fine tubular pores; few thin clay films in pores; moderately calcareous; strongly alkaline; gradual wavy boundary.

C1ca-27 to 33 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; strongly calcareous; moderately alkaline; gradual wavy boundary.

C2ca-33 to 63 inches; very pale brown (10YR 7/3) loam, dark brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; few very fine tubular pores; strongly calcareous; moderately alkaline.

The A horizon is pale brown, very pale brown, or light brownish gray.

The B horizon is pale brown, brown, yellowish brown, and light yellowish brown.

The C horizon is light yellowish brown, very pale brown, or white loam and silt loam. In some pedons, durinodes make up as much as 10 percent of the C horizon.

Purdam series

The Purdam series consists of well drained soils that are moderately deep to a duripan. These soils formed in loess or silty alluvium that is underlain by mixed alluvium. They are on low and intermediate alluvial terraces and have slopes of 0 to 8 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Purdam soils are near Abo, Chilcott, Colthorp, Elijah, Power, Scism, and Sebree soils. Unlike Purdam soils, Abo soils are somewhat poorly drained. Colthorp, Chilcott, Elijah, and Sebree soils have a continuous, indurated duripan. Scism soils do not have an argillic horizon. Power soils do not have a duripan.

Typical pedon of Purdam silt loam, 0 to 2 percent slopes, about 2 miles north and 4 miles west of Meridian, approximately 550 feet south and 190 feet east of the NW cor. of the NE1/4 of sec. 14, T. 4 N., R. 1 W.

Ap-0 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common medium interstitial pores; neutral; abrupt smooth boundary.

B2t-10 to 17 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; brown (7.5YR 5/2 and 4/2) organic stains on peds; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; few very fine and fine roots; common medium tubular pores; continuous moderately thick clay films on faces of peds; mildly alkaline; clear smooth boundary.

B3t-17 to 22 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium and fine

subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common medium tubular pores; few moderately thick clay films on faces of peds; moderately alkaline; clear wavy boundary.

C1ca-22 to 30 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and plastic; few very fine and fine roots; common medium tubular pores; moderately calcareous; moderately alkaline; clear wavy boundary.

C2ca-30 to 37 inches; very pale brown (10YR 8/3) loam, pinkish gray (7.5YR 7/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; common medium tubular pores; strongly calcareous; moderately alkaline; abrupt smooth boundary.

C3casim-37 to 49 inches; light yellowish brown (10YR 6/4) weakly cemented duripan, dark yellowish brown (10YR 4/4) moist; weakly cemented, highly fractured platy laminations; thin opal stringers throughout; extremely hard, very firm; common lime veins; strongly calcareous; moderately alkaline.

IIC4ca-49 to 60 inches; light gray (10YR 7/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; moderately calcareous; moderately alkaline.

The A horizon is light brownish gray, grayish brown, pale brown, or brown. It is not both darker than 5.5 dry and 3.5 moist.

The C horizon above the duripan is light gray, light brownish gray, pale brown, and very pale brown. The C horizon below the duripan is light gray, very pale brown, or variegated. The fine earth fraction ranges from loam to loamy sand and is 0 to 45 percent gravel.

The duripan is at a depth of 20 to 40 inches.

Quincy series

The Quincy series consists of very deep, excessively drained soils. These soils formed in mixed eolian sands. Quincy soils are on alluvial terraces in the foothills and on basalt plains. The slopes are 2 to 80 percent. The average annual precipitation is 8 inches, and the average annual temperature is 52 degrees F.

Quincy soils are similar to Feltham soils. They are near Bram, Feltham, and Garbutt soils. Unlike Quincy soils, Feltham soils are sandy loam in the control section. Garbutt soils are less than 15 percent fine sand or coarser material in the control section.

Typical pedon of Quincy sand, 2 to 8 percent slopes, about 7 miles west of Swan Falls Dam in the Snake River Canyon, approximately 400 feet north and 550 feet west of the SE cor. of the NW1/4 of sec. 32, T. 1 S., R. 1 W.

C1-0 to 8 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; single grain; loose; mildly alkaline; clear smooth boundary.

C2-8 to 18 inches; light brownish gray (10YR 6/2) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose; many fine and very fine roots; mildly alkaline; clear smooth boundary.

C3-18 to 60 inches; variegated sand; single grain; loose; mildly alkaline.

In some pedons, the texture is sand, fine sand, or loamy sand throughout.

In some pedons in this survey area, the Quincy soil is 15 to 20 percent coarse fragments that are 1 millimeter to less than 3 millimeters in diameter; therefore, it is outside the range of characteristics for the Quincy series. The difference, however, does not affect the use and management of the soil.

Rainey series

The Rainey series consists of moderately deep, well drained soils. These soils formed in material that weathered from granite. They are on mountains, and they have slopes of 15 to 65 percent. The average annual precipitation is 16 inches, and the average annual temperature is 47 degrees F.

Rainey soils are similar to Ola soils. They are near Ladd, Ola, and Searles soils. Unlike Rainey soils, Ola soils have a mollic epipedon that is more than 20 inches thick, and they are frigid. Ladd and Searles soils have an argillic horizon.

Typical pedon of Rainey coarse sandy loam in an area of Rainey-Ola coarse sandy foams, 15 to 30 percent slopes, about 7 miles east of Boise, approximately 550 feet south and 190 feet east of the NW cor. of the NE1/4 of sec. 14, T. 4 N., R. 1 W.

A1-0 to 7 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine interstitial and tubular pores; about 10 percent pebbles; slightly acid; clear smooth boundary.

AC-7 to 12 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; about 10 percent pebbles; slightly acid; clear smooth boundary.

C1-12 to 22 inches; light brownish gray (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; about 30 percent pebbles; slightly acid; clear wavy boundary.

Cr2-22 to 30 inches; pale brown (10YR 6/3) highly fractured, weathered granite, strong brown (7.5YR 5/6) moist; rock structure; hard, firm; moderately thick continuous clay films on surfaces of rock fragments and in cracks; slightly acid; diffuse wavy boundary.

R-30 inches; somewhat disintegrated granite.

The A horizon is dark grayish brown or grayish brown. The AC horizon, if present, is dark grayish brown or grayish brown. The texture in both horizons is coarse sandy loam or loam.

The C horizon is light brownish gray, pale brown, grayish brown, or yellowish brown loamy coarse sand, gravelly loam, or gravelly coarse sandy loam. The Cr horizon is pale brown or light brownish gray, and it has many or continuous moderately thick clay films on surfaces of rock fragments and in cracks.

Bedrock is at a depth of 20 to 40 inches.

Ridenbaugh series

The Ridenbaugh series consists of well drained soils that are shallow to a duripan. These soils formed in loess or silty alluvium. They are on alluvial plains and have slopes of 0 to 4 percent. The average annual precipitation is 12 inches, and the average annual temperature is 51 degrees F.

Ridenbaugh soils are similar to the Kunaton soils. They are near the Chilcott, Colthorp, Elijah, Kunaton, Purdam, and Sebree soils. Chilcott, Elijah, Purdam, and Sebree soils have a duripan at a depth of 20 to 40 inches. Colthorp soils are less than 35 percent clay in the control section. Kunaton soils have bedrock at a depth of 20 to 40 inches.

Typical pedon of Ridenbaugh silty clay loam in an area of Ridenbaugh-Sebree silty clay loams, 0 to 2 percent slopes, about 8 miles south of Boise, approximately 675 feet north and 210 feet west of the SW cor. of the NW1/4 of sec. 8, T. 1 N., R. 2 E.

A2-0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; strong thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few medium and common fine roots; common coarse and many fine vesicular pores; mildly alkaline; abrupt smooth boundary.

B2t-3 to 9 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure parting to strong medium subangular blocky; hard, firm, very sticky and very plastic; few medium and common fine roots; common very fine and fine tubular pores; continuous thick clay films on faces of peds and in pores; moderately alkaline; clear smooth boundary.

B3tca-9 to 13 inches; light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; hard, firm,

sticky and plastic; common fine and very fine roots; few very fine and fine tubular pores; many moderately thick clay films on faces of peds and in pores; few large strongly calcareous lime veins and splotches; moderately alkaline; clear smooth boundary.

C1ca-13 to 17 inches; very pale brown (10YR 8/3) silt loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; 20 percent durinodes; strongly calcareous; strongly alkaline; abrupt smooth boundary.

C2casim-17 to 33 inches; white (10YR 8/2) duripan, very pale brown (10YR 7/4) moist; alternating layers of indurated plate-like laminations 1 inch to 3 inches thick with a continuous opalized upper surface, and loose soil material 0.5 inch to 2 inches thick; a thin root mat covers the upper surface of the pan; strongly calcareous; strongly alkaline; clear wavy boundary.

IIC3ca-33 to 72 inches; very pale brown (10YR 7/3) sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; 10 percent fine pebbles; strongly calcareous; strongly alkaline.

The A2 horizon is pale brown or light brownish gray.

The B2t horizon is yellowish brown or brown clay, clay loam, or silty clay. The B3tca horizon is light yellowish brown or very pale brown clay loam, silty clay, or clay.

The Ccasim horizon is indurated or strongly cemented. The C horizon below the duripan is sandy loam or loamy sand in the fine-earth fraction; it is 5 to 45 percent gravel pebbles.

The duripan is at a depth of 10 to 20 inches. The control section is, by weighted average, 38 to 50 percent clay.

Scism series

The Scism series consists of well drained soils that are moderately deep to a duripan. These soils formed in loess or silty alluvium. They are on basalt plains and have slopes of 0 to 12 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Scism soils are similar to Garbutt, Minidoka, and Truesdale soils. They are near Elijah, Garbutt, McCain, Minidoka, Potratz, Power, Purdam, Shabliss, Trevino, Trio, Truesdale, and Turbyfill soils. Unlike Scism soils, Garbutt soils are not cemented and do not have a calcic horizon. Minidoka and Elijah soils have an indurated duripan. McCain and Potratz soils are 20 to 40 inches deep to basalt. Power and Purdam soils have an argillic horizon. Shabliss and Trio soils have a duripan at a depth of 10 to 20 inches. Trevino soils are 10 to 20 inches deep to basalt. Truesdale soils are more than 15 percent fine

sand or coarser in the control section. Turbyfill soils are calcareous throughout.

Typical pedon of Scism silt loam, 0 to 2 percent slopes, about 7 miles south of Kuna, approximately 330 feet north and 825 feet west of the SE cor. of the NW1/4 of sec. 34, T. 1 N., R. 1 W.

A1-0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak very thin platy structure parting to weak very fine granular; loose, slightly sticky and slightly plastic; many fine roots; many very fine interstitial pores; mildly alkaline; abrupt smooth boundary.

C1ca-4 to 14 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; weak very fine tubular pores; moderately calcareous; moderately alkaline; gradual smooth boundary.

C2ca-14 to 26 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; moderately calcareous; moderately alkaline; abrupt smooth boundary.

C3ca-26 to 32 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; 20 percent weakly cemented durinodes; strongly calcareous; strongly alkaline; abrupt smooth boundary.

C4casim-32 to 39 inches; pale brown (10YR 6/3) duripan, brown (10YR 4/3) moist; massive; extremely hard, extremely firm, brittle; thin opal stringers occur throughout the matrix; few very fine roots passing through fractures; few very fine tubular pores; 30 percent durinodes; strongly calcareous; strongly alkaline; abrupt wavy boundary.

C5ca-39 to 65 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; moderately calcareous; strongly alkaline.

The A horizon is brown, pale brown, or light brownish gray.

In some pedons there is a cambic horizon that is brown, pale brown, or light brownish gray silt loam or silt.

The C horizon is white, light gray, very pale brown, light gray, light brownish gray, pale brown, or light yellowish brown silt loam or silt.

The duripan is at a depth of 20 to 40 inches. It may contain very thin, discontinuous, opalized lenses. Basalt is commonly at a depth of more than 60 inches; in some pedons, it is at a depth of 40 to 60 inches. Basalt cobbles and stones make up 0 to 15 percent of the substratum in pedons that are underlain by bedrock.

Searles series

The Searles series consists of moderately deep, well drained soils. These soils formed in material that weathered from granite. They are on side slopes of mountains, and they have slopes of 4 to 80 percent. The average annual precipitation is 15 inches, and the average annual temperature is 50 degrees F.

Searles soils are similar to the Rainey soils. They are near Ada, Brent, Day, Ladd, Ola, Rainey, and Tenmile soils. Unlike Searles soils, Ada, Brent, Day, and Tenmile soils are more than 35 percent clay in the control section. Ladd, Ola and Rainey soils are less than 35 percent coarse fragments in the control section.

Typical pedon of Searles gravelly loam in an area of Searles-Ladd complex, 30 to 65 percent slopes, about 7 miles east of Boise, approximately 580 feet north and 100 feet west of the SE cor. of the SW1/4 of sec. 27, T. 4 N., R. 3 E.

A11-0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine tubular and interstitial pores; 20 percent pebbles; neutral; clear smooth boundary.

A12-4 to 9 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; common fine tubular and interstitial pores; 20 percent pebbles; mildly alkaline; clear wavy boundary.

B21t-9 to 14 inches; pale brown (10YR 6/3) fine gravelly coarse sandy clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine interstitial and tubular pores; few thin clay films on faces of peds; 20 percent fine pebbles and 10 percent cobbles of weathered granite; mildly alkaline; clear irregular boundary.

B22t-14 to 30 inches; pale brown (10YR 5/3) very gravelly coarse sandy clay loam, brown (7.5YR 4/4) moist; moderate medium prismatic structure; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common moderately thick clay films on faces of peds; 35 percent pebbles and 15 percent cobbles and stones of weathered granite; neutral; diffuse irregular boundary.

R-30 inches; fractured, slightly weathered granite; in the upper 3 to 6 inches it is highly weathered, and thick continuous clay films are on the surfaces of the fragments.

The A horizon is grayish brown and brown.

The B2t horizon is pale brown and brown fine gravelly coarse sandy clay loam, very gravelly coarse sandy clay loam, and very gravelly loam.

The Cr horizon, if present, is pale brown or light brownish gray and has many or continuous moderately thick clay films on surfaces of rock fragments and in cracks.

Bedrock is at a depth of 20 to 40 inches.

Sebree series

The Sebree series consists of well drained, sodium-affected soils that are moderately deep to a duripan. These soils formed in loess or silty alluvium that is underlain by basalt or mixed alluvium. They are on high alluvial terraces and basalt plains and have slopes of 0 to 8 percent. The average annual precipitation is 11 inches, and the average annual temperature is 51 degrees F.

Sebree soils are similar to Kiesel Variant soils. They are near Bowns, Brent, Chilcott, Colthorp, Elijah, Kunaton, McCain, Pipeline, Power, Purdam, Ridenbaugh, and Trevino soils. Unlike Sebree soils, Kiesel Variant soils do not have a duripan. Bowns, Brent, Chilcott, Kunaton, and Ridenbaugh soils are more than 35 percent clay in the control section. Colthorp, Elijah, McCain, Power, Purdam, and Trevino soils have less than 15 percent sodium saturation.

Typical pedon of Sebree silty clay loam, 0 to 2 percent slopes, about 1/2 mile south and 1 mile west of Blacks Creek Reservoir, approximately 1,280 feet north and 1,220 feet west of the SE cor. of the NW1/4 of sec. 1, T. 1 N., R. 2 E.

A2-0 to 1 inch; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine vesicular pores; neutral; abrupt smooth boundary.

B21t-1 inch to 5 inches; brown (7.5YR 5/2) silty clay loam, brown (10YR 4/3) moist; moderate very fine columnar structure parting to strong very fine subangular blocky; hard, firm, sticky and plastic; few fine roots; common very fine and fine interstitial pores; strongly alkaline; abrupt smooth boundary.

B22t-5 to 10 inches; light yellowish brown (10YR 6/4) silty clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine subangular blocky; very hard, very firm, sticky and plastic; few fine roots; common very fine tubular pores; strongly alkaline; clear smooth boundary.

B23t-10 to 22 inches; light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure parting to strong fine subangular blocky; very hard, very firm, sticky and plastic; common very fine tubular pores; many large prominent splotches and veins of neutral

salts and slightly calcareous lime on peds; strongly alkaline; gradual wavy boundary.

B24t-22 to 30 inches; light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure parting to strong fine subangular blocky; very hard, very firm, sticky and plastic; few very fine tubular pores; nearly continuous splotches and veins of neutral salts and slightly calcareous lime cover peds; strongly alkaline; gradual wavy boundary.

C1-30 to 34 inches; very pale brown (10YR 7/3) loam, light yellowish brown (10YR 6/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine interstitial pores; 15 percent duripan fragments and durinodes; moderately calcareous; strongly alkaline; gradual wavy boundary.

C2-34 to 42 inches; white (10YR 8/2) duripan, very pale brown (10YR 8/3) moist; alternating lenses, 3 to 5 inches thick, of indurated pan with 1 inch to 2 inches of loose soil material between lenses; an opalized layer, 1/16 to 1/4 inch thick, covers the duripan.

IIC3-42 to 60 inches; variegated sand and gravel; 70 percent pebbles; moderately calcareous with lime pendants on pebbles; moderately alkaline.

The A horizon is grayish brown, pale brown, light grayish brown, and light gray. In some pedons, about 0.1 percent of the surface is covered by stones. In some pedons, about 3 to 5 percent of the surface is covered by basalt cobbles and stones.

The B2t horizon is brown, light yellowish brown, and pale brown silty clay loam and clay loam. The upper part of the B2 horizon is more than 15 percent exchangeable sodium.

The Cca horizon above the pan is very pale brown, white, and pinkish white silt loam and loam.

The duripan is at a depth of 20 to 40 inches. Typically, it is underlain by sand and gravel; but in some pedons, it is underlain by basalt at a depth of 40 to 60 inches.

Shabliss series

The Shabliss series consists of well drained soils that are shallow to a duripan. These soils formed in wind-reworked alluvium. They are on basalt plains and have slopes of 0 to 4 percent. The average annual precipitation is 8 inches, and the average annual temperature is 52 degrees F.

Shabliss soils are similar to Trio soils. They are near Garbutt, Minidoka, Scism, Trevino, Trio, Truesdale, and Turbyfill soils. Garbutt and Turbyfill soils are more than 40 inches deep. Minidoka, Scism, and Truesdale soils have a pan at a depth of 20 to 40 inches. Trevino soils are less than 20 inches deep to basalt bedrock. Trio soils are 20 to 40 inches deep to bedrock.

Typical pedon of Shabliss very fine sandy loam, 0 to 2 percent slopes, about 3 miles northeast of Swan Falls

Dam, 10 feet north and 530 feet east of the SW cor. of sec. 10, T. 2 S., R. 1 E.

- A1-0 to 3 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; weak very thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.
- A2-3 to 5 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; clear smooth boundary.
- B21-5 to 10 inches; yellowish brown (10YR 5/4) silt loam, dark brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; mildly alkaline; gradual smooth boundary.
- B22-10 to 13 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; moderately alkaline; clear smooth boundary.
- C1ca-13 to 17 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; massive; very hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; few medium and common very fine and fine tubular pores; 35 percent durinodes; common fine lime veins; slightly calcareous; moderately alkaline; abrupt wavy boundary.
- C2casim-17 to 27 inches; very pale brown (10YR 7/3) duripan, yellowish brown (10YR 5/4) moist; massive; very hard, very firm; thin opalized surface, which is covered by a dense root mat, overlying a matrix that is weakly cemented and brittle when wet; 45 percent durinodes; common fine lime veins; strongly calcareous; strongly alkaline; abrupt smooth boundary.
- IIC3ca-27 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; 20 percent firm durinodes; 5 percent fine or medium subrounded basalt pebbles; strongly calcareous; strongly alkaline.

The A horizon is pale brown, grayish brown, or brown. It is not both darker than 5.5 dry and 3.5 moist.

The B horizon is silt loam or very fine sandy loam.

The Cca horizon above the pan is pale brown, very pale brown, or light yellowish brown light loam or fine sandy loam. Durinodes make up 20 to 40 percent of this horizon. The Ccasi horizon is weakly or strongly cemented and is 25 to 50 percent durinodes. It is at a depth of 10 to 20 inches. The C horizons above the duripan

commonly contain a slight accumulation of soluble salts and exchangeable sodium before the soil is cultivated under irrigation.

Tenmile series

The Tenmile series consists of very deep, well drained soils. These soils formed in coarse, granitic alluvium. They are on dissected alluvial plains and have slopes of 0 to 65 percent. The average annual precipitation is 12 inches, and the average annual temperature is 51 degrees F.

Tenmile soils are similar to Ada soils. They are near Ada, Brent, Chilcott, Day, Ladd, and Searles soils. Unlike Tenmile soils, Ada, Ladd, and Searles soils have a mollic epipedon. Brent, Chilcott, and Day soils are less than 35 percent coarse fragments in the control section.

Typical pedon of Tenmile very gravelly loam, 12 to 30 percent slopes, about 3 1/2 miles southwest of the Boise Municipal Airport, approximately 900 feet north and 150 feet east of the SW cor. of sec. 7, T. 2 N., R. 2 E.

- A1-0 to 10 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and few medium roots; many fine and medium tubular pores; 35 percent pebbles; mildly alkaline; gradual smooth boundary.
- B21t-10 to 14 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark brown (10YR 3/3) moist; yellowish brown (10YR 5/4) coatings on faces of peds; strong medium subangular blocky structure; hard, friable, sticky and plastic; common fine roots; many very fine and fine tubular pores; many thick clay films on faces of peds and in pores; 30 percent pebbles and 5 percent cobbles; mildly alkaline; clear smooth boundary.
- B22t-14 to 31 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark brown (10YR 3/3) moist; yellowish brown (10YR 5/4) coatings on faces of peds; strong medium subangular blocky structure, very hard, very firm, sticky and plastic; few fine roots; common very fine and fine tubular pores; continuous thick clay films on faces of peds; 40 percent pebbles and 10 percent cobbles; mildly alkaline; clear smooth boundary.
- B23t-31 to 37 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay, dark brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; common very fine and fine tubular pores; many moderately thick clay films on faces of peds; 40 percent pebbles and 10 percent cobbles; mildly alkaline; gradual wavy boundary.
- C1-37 to 49 inches; brownish yellow (10YR 6/6) very gravelly sandy clay loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky

structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; 50 percent pebbles and 10 percent cobbles; moderately alkaline; gradual smooth boundary.

C2ca-49 to 60 inches; variegated very gravelly loamy coarse sand; single grain; loose; 50 percent pebbles and 15 percent cobbles; slightly calcareous; moderately alkaline.

The A horizon is pale brown or brown. It does not have the color and the depth required for a mollic epipedon.

The B2t horizon is light yellowish brown or pale brown and has darker coatings on faces of peds in the upper part.

The C horizon is brownish yellow, light yellowish brown, or variegated very gravelly sandy clay loam, very gravelly loamy coarse sand, and very gravelly sand. In some pedons, there is no slightly or moderately calcareous Cca horizon.

Tindahay series

The Tindahay series consists of very deep, somewhat excessively drained soils. These soils formed in acid igneous alluvium. They are on alluvial fans and low alluvial terraces adjacent to intermittent drainageways and have slopes of 0 to 8 percent. The average annual precipitation is 12 inches, and the average annual temperature is 50 degrees F.

Tindahay soils are similar to Falk and Moulton soils. They are near Cashmere, Chardoton, Falk, Harpt, Haw, Kiesel Variant, Jenness, Lankbush, Moulton, Payette, and Quincy soils. Unlike Tindahay soils, Falk soils are somewhat poorly drained. Harpt and Moulton soils have a mollic epipedon. Cashmere, Jenness, and Quincy soils do not have strongly contrasting textures in the control section. Chardoton, Haw, Kiesel Variant, Lankbush and Payette soils have an argillic horizon.

Typical pedon of Tindahay fine sandy loam, 0 to 2 percent slopes, about 2 miles north of Boise, in Polecat Gulch, approximately 1,100 feet south and 470 feet east of the NW cor. of the NE1/4 of sec. 20, T. 4 N., R. 2 E.

A1-0 to 8 inches; light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; neutral; abrupt smooth boundary.

C1-8 to 13 inches; light brownish gray (10YR 6/2) fine sandy loam; brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; neutral abrupt smooth boundary.

C2-13 to 23 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; slightly

hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular and interstitial pores; neutral; abrupt smooth boundary.

C3-23 to 36 inches; light gray (10YR 7/2) loamy coarse sand, grayish brown (10YR 5/2) moist; single grain; loose; few very fine roots; common very fine tubular and interstitial pores; 10 percent fine pebbles; neutral; gradual smooth boundary.

IIC4-36 to 60 inches; variegated fine gravelly loamy coarse sand; single grain; loose; few very fine roots; 30 percent fine pebbles; neutral.

The A horizon is light brownish gray, pale brown, or grayish brown. It is not dark and thick enough to be classified as a mollic epipedon.

The C horizon in the upper part is light brownish gray, pale brown, or very pale brown fine sandy loam, sandy loam, or coarse sandy loam. In the lower part it is light gray, very pale brown, or variegated loamy coarse sand, fine gravelly loamy coarse sand, or very gravelly coarse sand and commonly contains thin, discontinuous lenses of fine sandy loam. Sandy textures are at a depth of 20 to 40 inches.

Trevino series

The Trevino series consists of shallow, well drained soils that formed in loess over basalt. These soils are on basalt plains and have slopes of 0 to 20 percent. The average annual precipitation is 9 inches, and the average annual temperature is 51 degrees F.

Trevino soils are near Chilcott, McCain, Minidoka, Potratz, Scism, Seabee, Trio, and Truesdale soils. Unlike Trevino soils, Chilcott, McCain, Minidoka, Potratz, Scism, Seabee, and Truesdale soils are more than 20 inches deep. Trio soils have a duripan at a depth of 10 to 20 inches.

Typical pedon of Trevino extremely stony silt loam in an area of Rock outcrop-Trevino complex, 5 to 20 percent slopes, about 5 miles south and 3 miles west of Kuna, about 900 feet north and 2,000 feet east of the SW cor. of sec. 17, T. 1 N., R. 1 W.

A1-0 to 1 inch; light brownish gray (10YR 6/2) extremely stony silt loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; stones cover 10 percent of the surface; neutral; abrupt wavy boundary.

A3-1 inch to 4 inches; light brownish gray (10YR 6/2) extremely stony silt loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 10 percent stones throughout; neutral; clear smooth boundary.

B2-4 to 10 inches; pale brown (10YR 6/3) stony silt loam, dark grayish brown (10YR 4/2) moist; moder-

ate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine and very fine tubular pores; 15 percent stones; neutral; abrupt smooth boundary.

C1ca-10 to 17 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; moderately calcareous; moderately alkaline; clear wavy boundary.

C2ca-17 to 19 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; massive; very hard, very firm; common very fine and fine roots; common very fine and fine tubular pores; 10 percent basalt pebbles; strongly calcareous; moderately alkaline; abrupt irregular boundary.

IIR-19 inches; jointed and fractured basalt with lime coating on upper surface and in cracks.

The A horizon is light brownish gray, pale brown, or brown. It is not both darker than 5.5 dry and 3.5 moist. The B horizon is pale brown or light brownish gray.

The C horizon is white or very pale brown silt loam or loam.

Bedrock is at a depth of 10 to 20 inches. The solum is 10 to 15 inches thick. The surface is 3 to 15 percent basalt stones, and the subsoil and substratum are 5 to 25 percent cobbles and stones. In some pedons the substratum is 5 to 10 percent weakly cemented nodules or cicada krotovina.

Trio series

The Trio series consists of well drained soils that are shallow to a duripan. These soils formed in wind-reworked alluvium on basalt plains. The slopes are 0 to 8 percent. The average annual precipitation is 8 inches, and the average annual temperature is 52 degrees F.

Trio soils are similar to Shabliss soils. They are near Garbutt, Minidoka, Scism, Shabliss, Trevino, Truesdale, and Turbyfill soils. Unlike Trio soils, the Garbutt and Turbyfill soils do not have a duripan. The Minidoka, Scism, and Truesdale soils have a duripan at a depth of 20 to 40 inches. Shabliss soils are not underlain by bedrock at a depth of 20 to 40 inches. Trevino soils do not have a duripan.

Typical pedon of Trio very fine sandy loam, 0 to 2 percent slopes, about 2 1/2 miles southeast of Swan Falls Dam, approximately 415 feet north and 425 feet west of the SE cor. of sec. 28, T. 2 S., R. 1 E.

Ap1-0 to 3 inches; pale brown (10YR 6/3) very fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak very thin platy structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine pores; neutral; clear smooth boundary.

Ap2-3 to 9 inches; pale brown (10YR 6/3) very fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; mildly alkaline; clear smooth boundary.

B2-9 to 14 inches; pale brown (10YR 6/3) very fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

C1casim-14 to 26 inches; light gray (10YR 7/2) duripan, pale brown (10YR 6/3) moist; massive; very hard, very firm; thin, discontinuous, opalized surface that is covered by a root mat; weakly cemented matrix, which is brittle when wet; 40 percent durinodes; strongly calcareous; strongly alkaline; clear wavy boundary.

C2ca-26 to 33 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable; few very fine and fine tubular pores; 10 percent durinodes; 5 percent subrounded basalt pebbles; slightly calcareous with common fine strongly calcareous lime veins; moderately alkaline; clear wavy boundary.

R-33 inches; jointed and fractured vesicular basalt.

The Ap or A1 horizon is pale or light yellowish brown. The B2 horizon is pale or light yellowish brown. Textures in both horizons are very fine sandy loam, silt loam, or loam.

In some pedons a thin, moderately or strongly calcareous Cca horizon is above the duripan. In this horizon the soil material is pale brown, very pale brown, or light yellowish brown. The duripan is weakly or strongly cemented. In some pedons it rests directly on the bedrock.

The duripan is at a depth of 10 to 20 inches. Basalt is at a depth of 20 to 40 inches. The content of cobbles and stones is 0 to 5 percent above the duripan and 0 to 10 percent between the pan and bedrock.

Truesdale series

The Truesdale series consists of well drained soils that are moderately deep to a duripan. These soils formed in wind-reworked alluvium and loess. They are on basalt plains and have slopes of 0 to 12 percent. The average annual precipitation is 8 inches, and the average annual temperature is 52 degrees F.

Truesdale soils are similar to Minidoka, Scism, and Trio soils. They are near Feltham, Garbutt, Potratz, Scism, Trevino, Trio, and Turbyfill soils. Feltham, Garbutt, and Turbyfill soils are more than 40 inches deep. Trevino soils are less than 20 inches deep. Minidoka and Scism soils are less than 15 percent fine sand or coarser material in the control section. Potratz and Trio soils are more than 18 percent clay in the control section.

Typical pedon of Truesdale fine sandy loam, 0 to 2 percent slopes, about 1 1/2 miles north of Swan Falls Dam, about 1,760 feet west and 850 feet south of the NE cor. of sec. 7, T. 2 S., R. 1 E.

A1-0 to 3 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine and medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and interstitial pores; mildly alkaline; abrupt smooth boundary.

B2-3 to 11 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; gradual smooth boundary.

C1ca-11 to 25 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; slightly calcareous; mildly alkaline; clear smooth boundary.

C2casim-25 to 34 inches; very pale brown (10YR 7/3) duripan, brown (10YR 4/3) moist; massive; very hard, very firm; very thin laminar opalized surface, which is covered by a dense root mat, overlying a matrix that is weakly cemented and brittle when wet; 35 percent durinodes; strongly calcareous; moderately alkaline; clear smooth boundary.

C3ca-34 to 60 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable nonsticky and nonplastic; strongly calcareous; strongly alkaline.

The A horizon is brown, light brownish gray, or pale brown. It is not both darker than 5.5 dry and 3.5 moist.

The B horizon is pale brown or light brownish gray fine sandy loam or sandy loam. In some pedons the B horizon is slightly calcareous below a depth of about 10 inches.

The Cca horizon is fine sandy loam or sandy loam and 20 to 35 percent durinodes.

The duripan is at a depth of 20 to 40 inches. Basalt is commonly at a depth of more than 60 inches. In some pedons it is at a depth of 40 to 60 inches. Where it is at a depth of less than 60 inches, basalt cobbles and stones make up 0 to 5 percent of the soil material above a depth of 40 inches and 0 to 15 percent of the soil material below that depth. The C horizon in the upper part is relatively high in content of soluble salts and exchangeable sodium. Normal irrigation readily leaches the salts below the root zone.

Turbyfill series

The Turbyfill series consists of very deep, well drained **soils**. These soils formed in eolian material or moderately

coarse textured alluvium. They are on basalt plains and have slopes of 0 to 35 percent. The average annual precipitation is 9 inches, and the average annual temperature is 53 degrees F.

Turbyfill soils are similar to Feltham and Jenness soils. They are near Feltham, Garbutt, Scism, Shabliss, Trevino, Trio, Truesdale, and Vanderhoff soils. Unlike Turbyfill soils, Jenness soils are not calcareous throughout the profile. Feltham soils have a sandy control section. Garbutt and Scism soils are silty throughout the control section. Shabliss, Trio, and Truesdale soils have a duripan at a depth of 10 to 20 inches. Trevino soils are underlain by bedrock between depths of 10 and 20 inches. Vanderhoff soils are less than 40 inches deep.

Typical pedon of Turbyfill fine sandy loam, 0 to 2 percent slopes, about 14 miles south and 1 mile east of Kuna, approximately 120 feet south and 100 feet west of the NE cor. of sec. 1, T. 2 S., R. 1 W.

A1-0 to 3 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine tubular pores; slightly calcareous; moderately alkaline; clear smooth boundary.

C1ca-3 to 14 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; moderately calcareous; moderately alkaline; gradual wavy boundary.

C2ca-14 to 23 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 5 percent hard durinodes; moderately calcareous; strongly alkaline; gradual wavy boundary.

C3ca-23 to 60 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; single grain; loose; few very fine and fine roots; few very fine and fine tubular pores; 20 percent hard durinodes; moderately calcareous; strongly alkaline.

The A horizon is pale brown or very pale brown.

The C horizon is fine sandy loam or sandy loam. Durinodes make up 5 to 25 percent of the C horizon.

In some pedons the soil material below a depth of 40 inches is 0 to 10 percent basalt gravel, cobbles, and stones.

Vanderhoff series

The Vanderhoff series consists of moderately deep, well drained soils. These soils formed in residuum and colluvium that derived from mudstone and tuffaceous lacustrine sediments. These sediments are capped by

basalt flows. The slopes are 30 to 60 percent. The average annual precipitation is 8 inches, and the average annual temperature is 54 degrees F.

Vanderhoff soils are similar to Turbyfill soils. They are near Feltham, Baldock, Scism, Shabliss, Trevino, Trio, Truesdale, and Turbyfill soils. Unlike Vanderhoff soils, Feltham, Baldock, and Turbyfill soils are more than 40 inches deep. Scism, Shabliss, Trio, and Truesdale soils have a duripan. Trevino soils are underlain by basalt at a depth of less than 20 inches.

Typical pedon of Vanderhoff extremely stony loam in an area of Vanderhoff soils, 30 to 60 percent slopes, in the Snake River Canyon, about 8 1/2 miles southeast of Swan Falls Dam, approximately 990 feet north and 1,760 feet west of the SW cor. of sec. 26, T. 3 S., R. 1 E.

A1-0 to 5 inches; light gray (10YR 7/2) extremely stony loam, brown (10YR 5/3) moist; weak very thin platy structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores; stones cover 10 percent of the surface; 10 percent fine basalt pebbles; slightly calcareous; moderately alkaline; clear smooth boundary.

C1-5 to 14 inches; light gray (10YR 7/2) gravelly loam, yellowish brown (10YR 5/5) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine interstitial and tubular pores; 25 percent fine basalt pebbles; slightly calcareous; mildly alkaline; clear smooth boundary.

C2ca-14 to 22 inches; white (10YR 8/2) fine sandy loam, pale yellow (2.5Y 7/4) moist; massive; hard, firm, nonsticky and nonplastic; fine roots; common very fine pores; strongly calcareous; mildly alkaline; gradual smooth boundary.

Cr3-22 to 40 inches; white (10YR 8/2) mudstone, pale yellow (2.5Y 7/4) moist; mudstone occurs in semi-consolidated platelike laminations 2 to 6 inches thick; very hard, very firm; slightly calcareous matrix, with strongly calcareous seams between laminations; neutral.

The A horizon is light gray or light brownish gray silt loam, fine sandy loam, or loam.

The C horizon is gravelly loam, fine sandy loam, or very fine sandy loam. The Cr horizon is white or light yellowish brown and contains faint or distinct mottles in some pedons. It includes sediments of siltstone, mudstone, claystone, and lacustrine tuff. The Cr horizon is at a depth of 20 to 40 inches.

Basalt gravel, cobbles, and stones cover 0 to 30 percent of the surface. The basalt influence is the result of an accumulation of colluvial material from the basalt cap overlying the sediments in which this soil developed.

Van Dusen series

The Van Dusen series consists of very deep well drained soils. These soils formed in acid igneous alluvium. They are on alluvial and lacustrine terraces and have slopes of 30 to 65 percent. The average annual precipitation is 14 inches, and the average annual temperature is 50 degrees F.

Van Dusen soils are similar to Haw, Ladd, and Payette soils. They are near Ada, Haw, Ladd, Lankbush, and Payette soils. Unlike Van Dusen soils, Ada soils are more than 35 percent gravel in the control section. Haw, Ladd, and Payette soils have a mollic epipedon that is less than 20 inches thick. Lankbush soils have an ochric epipedon.

Typical pedon of Van Dusen loam in an area of Van Dusen-Payette complex, 30 to 65 percent slopes, about 3 miles east of Boise, approximately 2,500 feet north and 440 feet east of the SW cor. of the NE1/4 of sec. 9, T. 3 N., R. 3 E.

A1-0 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak very fine and fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium and common coarse roots; many very fine and common fine interstitial pores; 10 percent pebbles; neutral; clear smooth boundary.

B1-14 to 22 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak medium and coarse subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; many very fine and fine and few medium tubular pores; 20 percent pebbles; neutral; gradual smooth boundary.

B21t-22 to 35 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; many very fine and fine tubular pores; common thin clay films on peds and in pores; 20 percent pebbles; common lamellae 0.1 to 0.25 inch thick and 3 to 4 inches apart with approximately 10 percent more clay than matrix of horizon; neutral; gradual smooth boundary.

B22t-35 to 44 inches; pale brown (10YR 6/3) coarse sandy clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; hard, friable, sticky and plastic; few very fine, fine, and medium roots; many very fine and fine and few medium tubular pores; common moderately thick clay films on faces of peds and in pores; common lamellae 0.5 to 0.75 inch thick and 2 to 4 inches apart with approximately 15 percent more clay than matrix of horizon; slightly acid; gradual smooth boundary.

C-44 to 60 inches; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 4/3) moist; massive; loose; few very fine and fine roots; neutral.

The A horizon is dark grayish brown, gray, and dark gray. It is 5 to 15 percent gravel.

The B horizon is gravelly loam, coarse sandy clay loam, or clay loam. It is 5 to 25 percent gravel.

The C horizon is pale brown or yellowish brown coarse sand, loamy coarse sand, or sandy loam.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly

of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as-

	<i>Inches</i>
Very low	0 to less than 2.5
Low	2.5 to 3.75
Moderate.....	3.75 to 5.0
High.....	5.0 to 7.5
Very high.....	More than 7.5

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cicada krotovina. Irregular tubular streaks within a soil horizon. They are caused by the filling of burrows of cicada nymphs with material from outside the burrows. The burrows are one to three inches long and about 5/8 inch in diameter.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water control measures is difficult.

Complex, soil. A map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are

Loose.-Noncoherent when dry or moist; does not hold together in a mass.

Friable.-When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.-When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.-When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.-When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.-When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.-When dry, breaks into powder or individual grains under very slight pressure.

Cemented.-Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.-Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.-Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow.

Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.-Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.-Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.-Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.-Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.-Water is removed from the soil so slowly that free water remains at or on the

surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Durinodes. Weakly cemented to indurated nodules. The cementing agent is silico-oxide, presumably opal and microcrystalline forms of silica.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it

occurs on an average of more than once in 2 years.

Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days.

Probable dates are expressed in months;

November-May, for example, means that flooding can occur during the period November through May.

Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Typically, the microrelief of Vertisols-clayey soils having a high coefficient of expansion and contraction with changes in moisture content. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum. Hydrus calcium sulphate.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.-An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.-The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.-A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.-The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.-The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.-Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are

assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasesers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants are those that follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are-

Border.-Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.-Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.-Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.-Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.-Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.-Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.-Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.-Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance-few, *common*, and *many*, *size-fine*, *medium*, and *coarse*; and contrast-faint, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mudstone. Soft sedimentary rock having relatively equal proportions of sand, silt, and clay particles.

Munsell notation. A designation of color by degrees of the three single variables-hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron,

manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *s/ow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Polypedon. A volume of soil having properties within the limits of a soil series, the lowest and most homogeneous category of soil taxonomy. A "soil individual."

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range (or rangeland). Land that, for the most part, produces native plants suitable for grazing by livestock; includes land supporting some forest trees.

Range condition. The health or productivity of forage plants on a given range, in terms of the potential productivity under normal climate and the best practical management. Condition classes generally recognized are *excellent*, *good*, *fair*, and *poor*. The classification is based on the percentage of original, or assumed climax vegetation on a site, as compared to what has been observed to grow on it when well managed.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind and amount of native vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as

	pH
Extremely acid	Below 4.5
Very strongly acid.....	4.5 to 5.0
Strongly acid.....	5.1 to 5.5
Medium acid.....	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline-alkali soil. A soil that contains a harmful concentration of salts and exchangeable sodium; contains

harmful salts and is strongly alkaline; or contains harmful salts and exchangeable sodium and is very strongly alkaline. The salts, exchangeable sodium, and alkaline reaction are in the soil in such location that growth of most crop plants is less than normal.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance

divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na⁺ to Ca⁺⁺ + Mg⁺. The degrees of sodicity are

	SAR
Slight.....	Less than 13:1
Moderate	13-30:1
Strong.....	More than 30:1

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than hori-

zontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil, or partly worked into the soil, to provide protection from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt*, *silt loam*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Tuff. A compacted deposit 50 percent or more volcanic ash and dust.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new

series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water. *Water table, apparent.* A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.